THE

Practical Teacher

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Edited by JOSEPH HUGHES.

'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more.'—COWPER.

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How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,

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225. The notation of TAA tefe and of tafa TAI can be most effectually taught at one time, the likenesses and differences between the two ways of placing the dot and the comma affording a considerable help to the memory. Write some blank pulses on the board, place the half pulse dot in each of the first two pulses; and reminding or eliciting from pupils that the comma is used for quarter divisions, get one pupil to place in the first pulse a comma in the proper position to show that the *second* half is to be divided, and another pupil to do the same for the *first* half. Rub out commas and get pupils to restore them, this time in reverse. Repeat this rubbing out and restoring until the notation and its significance are quite familiar. Add notes in the divisions. Establish the association—quarters first, comma first; quarters last, comma last. Get pupils to discover which notation stands for TAA tefe, and which for tafa TAI. Fill up the remaining pulses, and, pointing from one to the other, get prompt utterance of the proper time names. Get pupils to alter TAA tefe into tafa TAI and *vice versâ*. The following examples recapitulate the points of the foregoing lesson, and show the growth of the notation on the board. Use wide pulses at the outset. The use of coloured chalk will be found of material assistance.

(1) Written by teacher.	| . : . | : ||
(2) Commas added by pupil.	| . , : , . | : ||
(3) Commas reversed by pupil.	| , . : . , | : ||
(4) Notes added by teacher. Time names associated.	|1 .1,1 : 1,1 .1 | : ||
(5) Other pulses filled by teacher.	|1,1 .1 : 1 .1,1 | 1 .1,1 : 1,1 .1 ||
(6) Each pulse of the above reversed.	|1 .1,1 : 1,1 .1 | 1,1 .1 : 1 .1,1 ||

226. The exercises to be given now should separate TAA tefe and tafa TAI. The plan of study should provide exercises in which TAA tefe is followed (1) by TAA, (2) TAATAI, (3) tafatefe; and tafa TAI should be treated in the same systematic way. Other successions can be taught as found in songs or pieces.

Specimen exercises on TAA tefe and tafa TAI :—

| m :m | m .m,f : s | f .f,m : r .r | m .m,r : d ||			
| s :m .m,r | d,r.m,f: s | l .s,f :m,f.m,r | d .d : d ||			
| d,r.m :m,f.s | f,m.r :m | m,f.s :f .m | r,d.r,m: d ||			
| s,l.s,f: m,f.s | f,m.r,f: m | m,r.d :d,r.m | r .r :d ||			

Such exercises should be followed by songs in which the new divisions abound. The following are good specimens :—

THE WOODMAN.

(*For two-part arrangement and remaining verses see Curwen's Royal Songster, No. 3, Price 1d.*)

Doh is F. M. 84. *Allegretto.*

| s_1 .l_1 ,t_1 : d	.r | m	.s	: s ||				
Out	in the bleak	cold	woods	he	stands,		
| l .s ,s : m	.d | m	.r	: r ||				
Swing - ing his	axe	with	stur - dy	hands,			
| s_1 .l_1 ,t_1 : d	.r | m	.s	: s ||				
Sharp - ly the	blue	jays	near	him	call,		
| l .s ,s : m	.d | m	.r	: d ||				
Soft - ly the	snow - flakes	round	him	fall;			
| f .f : m	.d ,d | l	.l	: s ||				
'What care	I	for the	ice	and	snow?		
| l ,l .s : m	,m .d | m	.r	: r ||				
There away,	there away	down	you	go,'			
| s_1 .l_1 ,t_1 : d	.r | m	.s	: s ||				
So sings the	wood - man	tall	and	brown,			
| l .s : m	.d ,d | m	.r	: d ||				
Ev - ery	time that a	tree	comes	down.			

BRITISH MUSEUM

ROUND IN THREE PARTS.

Doh is G. *Arnold.*

.s$_1$	d	.d	.t$_1$	:l$_1$	.l$_1$	r	.r	.d	:t$_1$	.t$_1$	
All	Na	-	ture	smiles	to	greet	fair	Spring,	And		
m	.m	.r	:d	.r	.m	.f	s	.s$_1$	:d	*.r	
flowers	their		scent	-	ed		tri	- bute	bring;	The	
m	.m	.r	:d	.d	f	.f	.m	:r	.r	
hap	-	py	birds	from	bloom	-	ing	spray,	Their	
s	.s	.f	:m	.r	.d	d	.r	:m	.s	
wel	-	come	sing	with	mer	-	ry	lay,	With	
s	.f	.m	.s	:d	.m	r	.d	.t$_1$	.d	:s$_1$	.t$_1$	
merry	merry		lay,	with	merry	merry		lay,	Their	
d	.d	.r	:m	.f	.s	s	.s	.s	.s	:s	.	‖
wel	-	come	sing	with	merry	merry		lay.				

227. The division of a pulse between two notes respectively three quarters and one quarter of a pulse in value, is one of the most important of all divisions. It occurs so abundantly in children's music generally that it is difficult to see how children in Standard III. and upwards can get on without knowing its notation and proper execution. The first lessons should forcibly contrast this division with half pulses. The primary thing to establish is the effect, the analysis of value being altogether an after consideration.

Get the class to imitate from pattern—

(1) TAA TAA TAATAI TAA

(2) TAA TAA TAA fe TAA

(3) TAA fe TAA TAA fe TAA

(4) TAA TAA fe TAATAI TAA

It is assumed that the teacher is fully able to execute the connection of the 'fe' to the ensuing pulse. If in early days the name TAA e fe have been acquired, the sooner it is abandoned the better it will be for teacher and taught.

228. When the ear is quite familiar with the bright and cheerful effect of the new division the notation may be introduced. One way of fixing attention to the notation, in association with the effect, is to write a familiar rhythmic form on the board, and to ask the class to discover when a new effect is substituted in one of the pulses. Thus write, say—

| l | :l .l | l | :— ‖

on the board The class to sing the rhythm to *laa*, and afterwards to discover if any alteration is made when you sing the passage. Sing it as written two or three times, then alter your performance, not the board, to sound as follows :

1	2 3	4		
l	:l .l	l	:— ‖

and, when the alteration is discovered, sing to numbers, and ask which number is the shortest in effect. This having been duly elicited, invite suggestions as to the value of this short note and, anyhow, settle that it is to be regarded as a quarter pulse note. The notation is best taught dogmatically, and not reasoned out from the notation of TAA tefe (viz., :l .l,l‖ :l .-,l‖ :l .,l‖) because the effect has little or nothing to do with TAA tefe.

The fact of notation to drive home is that when a pulse is divided into ¾ and ¼ a dot and a comma are placed *close* together near the quarter pulse note *at the end*,

thus :l .,l ‖ not thus :l. ,l ‖ or thus :l ., l ‖

229. When the notation is understood the time name should be connected. The principle of the construction of the time name is to provide a syllable for each note struck. In this case two notes are struck, one at the beginning of the pulse, and one on the last quarter. The syllabic time name for any note of a half pulse or more in value struck at the beginning of a pulse is 'TAA,' and of a note struck on the last quarter 'fe.' But the compound so evolved is not easily pronounced by itself. This fact, however, is no obstacle to practice, because in actual music this division is rarely followed by a rest. The most important feature of its execution is the connection of the quarter note to whatever occurs in the ensuing pulse. Systematic studies should be constructed so as to afford practice in all the common successions found in ordinary music.

Specimen exercises on TAA fe with various successions.

(1) Followed by TAA.

| m | :m .f | s | :f .m | r | :m .r | d | :— ‖

(2) Followed by TAATAI.

| s .,l :s .f | m .f :s .m | r .m :f .m | m .r :d ‖

(3) Followed by another TAAfe.

| m .f :m .r | d :m | s .,l :s .f | m :d ‖

(4) Followed by TAAtefe.

| d .r :m .r,d | t$_1$ .d :r | f .,s :l .s,f | m .r :d ‖

(5) Followed by tafaTAI.

| m .f :s,f.m | r .m :f,m.r | d .r :m,r.d | d .t$_1$:d ‖

(6) Followed by tafatefe.

| d .r :m,r.d,t$_1$ | d .r :m | r .m :f,m.r,d | m .r :d ‖

230. The division :$\overset{1}{1}$.$\overset{3}{1}$.— ‖ is not of frequent
ta fa - AI

occurrence, at least in English music. It is, however, a characteristic feature of many Scotch tunes, *e.g.*,

'Within a mile of Edinboro' town.'

:m .f | s,m.- :r .m | d :m .d | l$_1$,d.- :s$_1$ .m$_1$ | s$_1$ |

etc.

'Comin' through the rye.'

| s$_1$.,s$_1$:s$_1$,m.- | r .,d :r,m.- | s$_1$,s$_1$.- :l$_1$.,s$_1$ | d :— ‖

etc.

It should be taught as needed. The time name should be pronounced sharply without separating the -AI from the 'fa' (tafay rather than tafa-AI). In performing this division in tune the effect should be simply that of two notes in rapid succession with an accent on the first.

(To be continued.)

Practical Kindergarten Lessons for English Elementary Schools.

BY MRS. MORTIMER.

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XI.

GIFT VII.

EXAMPLES OF LESSONS.—TABLETS.

The former Gifts, though possessing in their separate forms different and essential characteristics, agreed in presenting solid bodies to the child, enabling him to represent real objects, *e.g.*, sofa, chair, table, house, &c.

The time has now arrived when the child should be led to grasp the idea of the picture or plane representation as distinct from the solid form of the object. For this purpose the tablets (Gift VII.) are introduced.

There are square and triangular tablets—the latter consisting of four sets, viz.:—right angled isosceles, equilateral, right angled scalene, and obtuse angled triangles.

The tablets are made of thin wood, and each side should be of a different colour, thus forming a suitable contrast to each other, as red and green, blue and orange, black and white, &c. By this means the sense of colour is greatly developed in the child.

1. *The Square Tablets* should be first used. To show that these tablets represent the surfaces of the cube it would be advisable to have a cube so constructed that its faces could be easily removed in front of the class.

The cube from Gift III. could also be used, the teacher covering its faces with the tablets, and after the class has recognized that with these additions we have still the cube, the tablets should be removed. At first only one tablet should be given to each child who should, by examining it, discover its relation to the cube. He will soon recognise that it is of the same shape and size as the face of the cube—that it has four edges, four corners, and four right angles.

The term 'right angle' will be new to the child, and it will be necessary for the teacher to explain it. Calling attention to the edges meeting at the corners, the children should be led to notice that a space is thus enclosed between the horizontal and vertical sides. The walls and floor of the room, the edges of the blackboard, slate, &c., would serve for further illustrations.

The teacher should get the children to move the tablet in different positions, and point out that in each case the one side always stands in a vertical position to the other or horizontal side, the angle thus formed is called a 'right angle.' How many right angles has your tablet? How many right angles has this slate, book, &c.

The children will probably have noticed that the opposite sides of the tablet have the same direction. If the teacher place several tablets together the children will readily see that the opposite edges will never meet, but always keep the same distance apart. In this way the idea of parallel lines can be demonstrated, The child having become thoroughly acquainted with his tablet is allowed to place it in all the different positions he can, and then a second tablet is given to him. After comparing the two, he

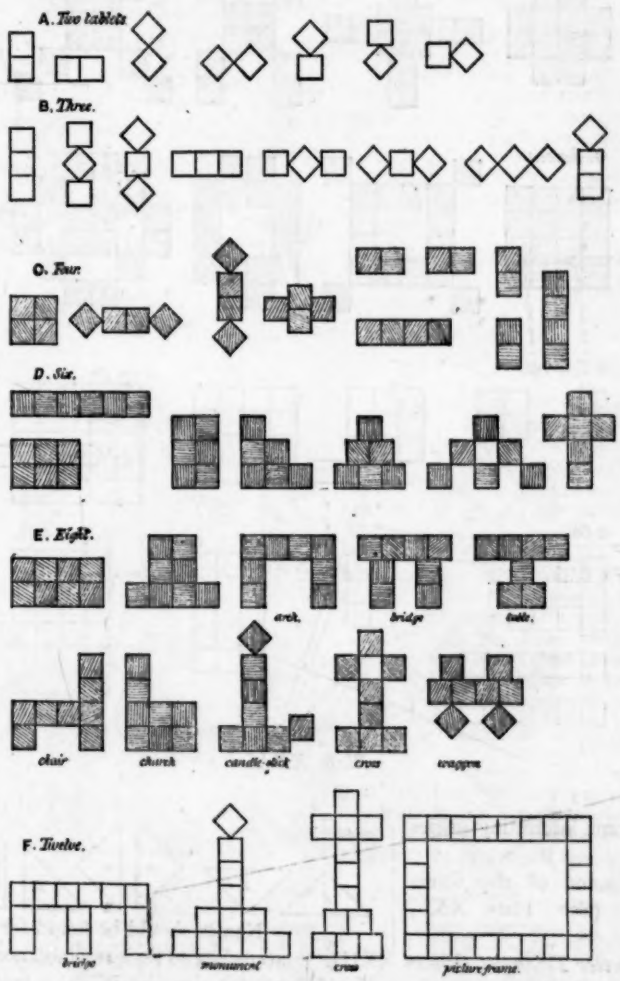


Plate XXI.

places them in different positions. Names should be given to these forms when possible, *e.g.*, place the two tablets side by side and an oblong is formed, Plate XXI. Lay one tablet corner-wise against the middle of the top of the other, and a flower in a pot is produced. Reverse the position of these and a pendant or medal is illustrated. Another tablet should be given when all the forms have been made with two.

With four tablets a greater variety of forms can be made, and with six and eight tablets nearly all the forms of the Third Gift may be made, though of course they will only be pictures of the said forms. The number of tablets should be increased at the discretion of the teacher.

Forms of Life, Knowledge, and Beauty may again be made with this gift. The number of the forms of Life is very limited. The forms of Beauty are similar to those made with Gift III., but here we have only surfaces, so that the star forms look better than when one cube high (Plate XXII.). Forms of Knowledge consist of squares and oblongs of different sizes (Plate XXII.).

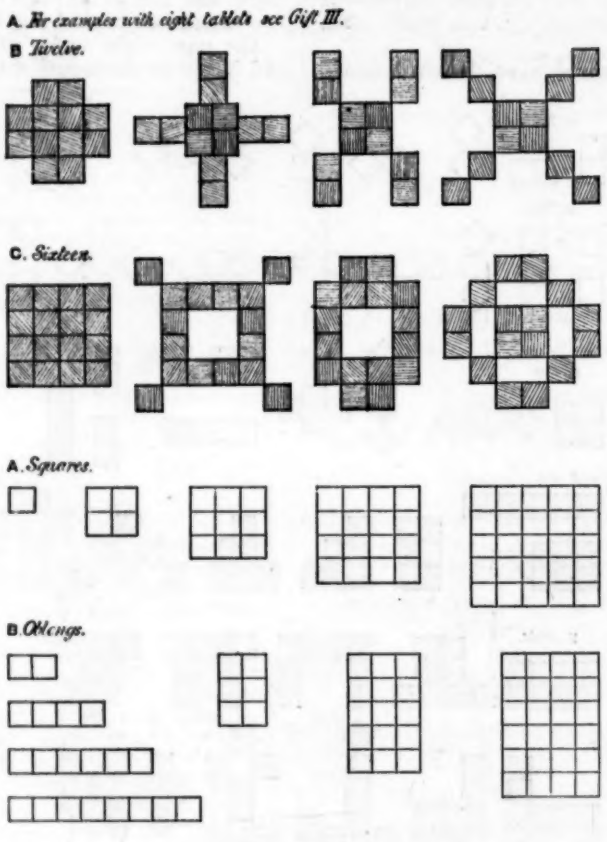


Plate XXII.

As the teacher talked with the children about the forms made with Gifts III. and IV., she should now lead them to converse about the forms made with the tablets, and tell them some interesting stories about these forms.

The following are some of the forms that can be made. (See Plate XXI., D.E.F.).

2. *Right Angled Isosceles Triangles* (Plates XXIII. and XXIV.).

When the children have become thoroughly acquainted with the square tablets the right angled isosceles triangles are introduced. On joining two together the children will see that they form a square the same size as the square tablets they have already had, but they will see a new line in this square. A slanting line running from the right top corner to the bottom left corner. This line is called a *diagonal*. The children will see that this line divides the square into two parts; if they put them on one another they will see that both these parts are the same size, therefore each part is a half square. The half square should now be compared with the whole square. The whole square has four edges, four corners, and four right angles, the half square has only three edges, three corners, and three angles; because it has three angles it is called a *triangle*, which means three angles. The edges and angles of the square to be compared with the edges and angles of the triangle. The edges of the square are all the same length, and the angles are all the same size—all right angles.

Two of the edges of the triangle are the same length, and one is longer; and it has one right angle and two smaller ones. If the corner that forms the right angle be compared with those which form these smaller angles, it will be found that the latter are much sharper. These angles are called sharp or *acute angles*. The children can now describe this triangle, the half of the square, and then place it in different positions thus—

Names should be found for these forms, if possible, according to their resemblance to some familiar object, *e.g.* (1) a mountain, (2) a funnel.

The child should next place two tablets in different positions. The number of tablets to be increased gradually. Each form made should, if possible, receive a name, and then should follow some conversation or story relating to it.

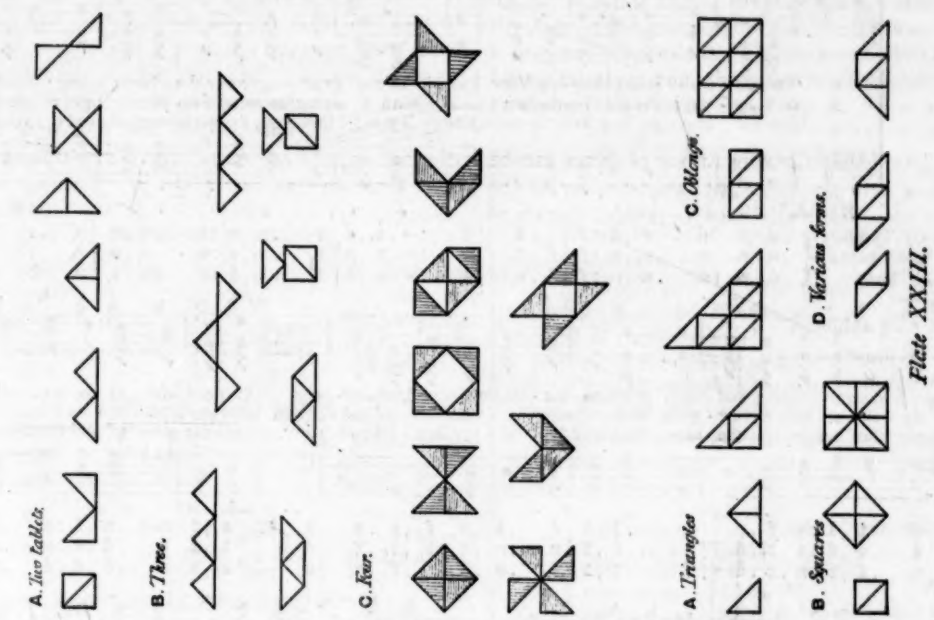


Plate XXIII.

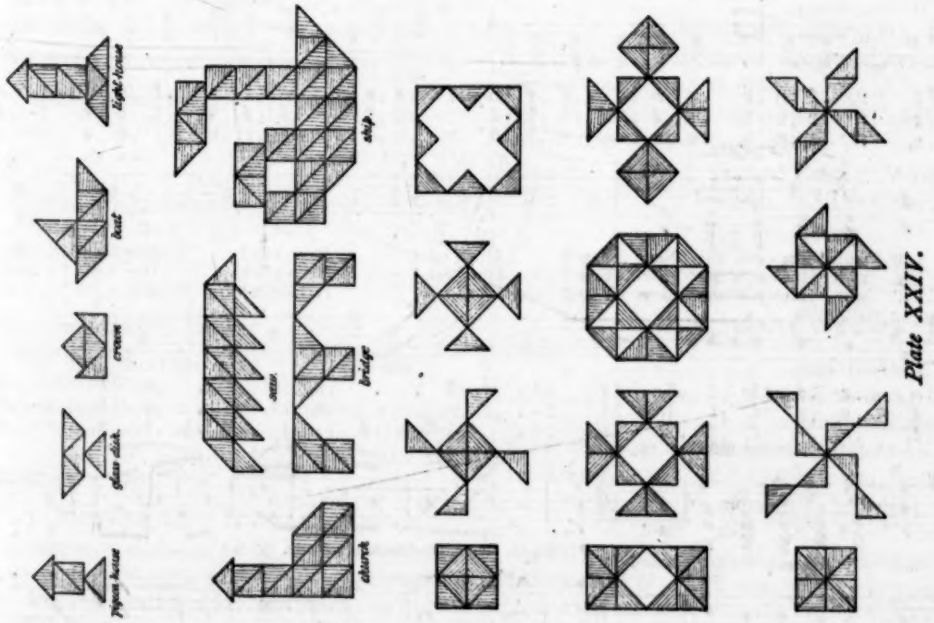
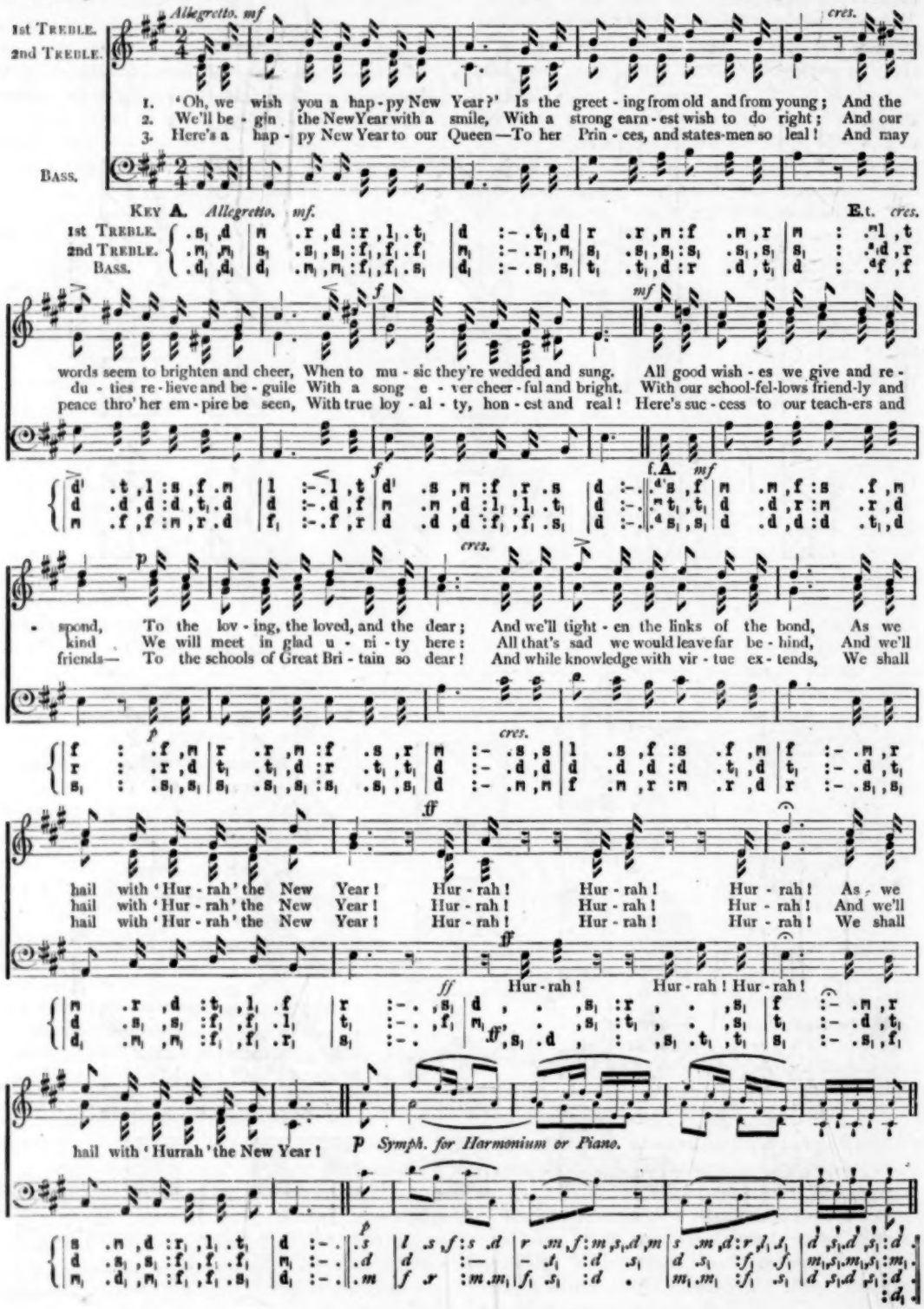


Plate XXIV.

NEW YEAR'S SONG.

Words by GEORGE BENNETT. *Music by* T. CRAMPTON.

Allegretto. mf
1st TREBLE.
2nd TREBLE.
BASS.
cres.
1. 'Oh, we wish you a hap-py New Year?' Is the greet-ing from old and from young; And the
2. We'll be-gin the New Year with a smile, With a strong earn-est wish to do right; And our
3. Here's a hap-py New Year to our Queen—To her Prin-ces, and states-men so leal! And may
KEY A. Allegretto. mf.
E.t. cres.
words seem to brighten and cheer, When to mu-sic they're wedded and sung. All good wish-es we give and re-
du-ties re-lieve and be-guile With a song e-ver cheer-ful and bright. With our school-fel-lows friend-ly and
peace thro' her em-pire be seen, With true loy-al-ty, hon-est and real! Here's suc-cess to our teach-ers and
f.A.
mf
p
cres.
-spond, To the lov-ing, the loved, and the dear; And we'll tight-en the links of the bond, As we
kind We will meet in glad u-ni-ty here: All that's sad we would leave far be-hind, And we'll
friends— To the schools of Great Bri-tain so dear! And while knowledge with vir-tue ex-tends, We shall
ff
hail with 'Hur-rah' the New Year! Hur-rah! Hur-rah! Hur-rah! As we
hail with 'Hur-rah' the New Year! Hur-rah! Hur-rah! Hur-rah! And we'll
hail with 'Hur-rah' the New Year! Hur-rah! Hur-rah! Hur-rah! We shall
Hur-rah! Hur-rah! Hur-rah!
hail with 'Hurrah' the New Year!
p Symph. for Harmonium or Piano.

Quarterly Arithmetical Tests.

BY JOSEPH WOLLMAN,

Head Master of the Wellgate Board School, Rotherham.

STANDARD I.—FIRST QUARTER.

1. 7, 350, 14, 9, 286

2. 709 + 206

3. 583 − 41

4. How many are 59, 204, 6, and 83 slates?

SECOND QUARTER.

1. 364, 508, 21, 97, 615

2. 356 + 270

3. 460 − 354

4. A boy had 125 nuts, and he ate 73. How many had he left?

THIRD QUARTER.

1. 78, 490, 6, 834, 702

2. 563 + 488

3. 782 − 95

4. A farmer had 56 sheep. He sold 39, and then bought 14. How many had he?

STANDARD II.—FIRST QUARTER.

1. From 12,014 take 3,017.

2. 4,360 + 95 + 27,018 + 647 + 58,902 + 3,176.

3. 13,569 × 19.

4. In a school of 800 children there are 276 girls and 189 infants. How many boys are there?

SECOND QUARTER.

1. Find the product of 4,896 and 750.

2. Take 27,013 from 40,060.

3. Divide 38,820 by 4, and write the answer in words.

4. There are 1,786 books on five shelves. On each of the first four there are 397 books. How many are there on the fifth shelf?

THIRD QUARTER.

1. Divide 71,983 by 11.

2. How much greater is 59,307 than 58,619?

3. 39,478 × 6,008.

4. In a bag there are eight thousand nuts. Of these 6,780 are sold, and 292 are bad. If the rest are divided equally among 8 boys, how many would each boy get?

STANDARD III.—FIRST QUARTER.

1 Divide forty thousand by 38.

2. How many times is 695 contained in six hundred and four thousand six hundred and fifty?

3. What is the product of seven hundred and eight and fifty-nine thousand and sixty-three?

4. 26 boys had 78 marbles each, and 19 boys had 49 each. How many more were required to make three thousand marbles?

SECOND QUARTER.

1. £47 18s 4½d. + £563 9s. 7¼d. + £84 11s. 9¾d. + 10s. 10¼d. + 11½d. + £4,005 16s. 0¼d.

2. 720 children each receive 7 oranges. How many boxes of oranges would be required, if each box contained 280 oranges?

3. Take nine hundred and six pounds and five pence three farthings from three thousand pounds eighteen shillings and a halfpenny.

4. A horse is worth £38 15s. and a carriage £7 10s. more. What are they worth together?

THIRD QUARTER.

1. What is the difference between £80,013 10s. 0¾d. and £7,808 11s. 1¼d.?

2. A horse, a cow, and two sheep cost £80. The horse cost £57 10s. and the cow £18 10s. What was the cost of each sheep?

3. What is the sum of £2,809 15s. 5½d., £18 18s. 9¾d., £57,043 13s. 10½d., £970 16s. 3¼d., £30,835 17s. 11¾d., and £6 14s. 8d.?

4. Two men and a woman were paid £5 for wages. Each man earned £1 17s. 6d. How much did the woman earn?

STANDARD IV.—FIRST QUARTER.

1. Multiply £702 14s 8¾d. by 95.

2. A man earns £1 18s. 6d. weekly. He spends £1 2s. 9d. on food, 6s. 8d. on clothes, and 4s. 6d. on rent. How much does he save in 15 weeks?

3. Divide £203,045 17s. 10¾d. by 67.

4. Forty sheep cost £85, and were sold for £100. What was the gain on each sheep?

SECOND QUARTER.

1. How many yards of telegraph wire would be required to stretch 67¾ miles?

2. How many pints are there in 37 qrs. 5 bus. 2 pks.?

3. Bring 2¼ acres to sq. inches.

4. If a servant's wages are £23 8s. a year, how much will she receive for 17 weeks?

THIRD QUARTER.

1. Reduce three hundred and five thousand and seventy-nine seconds to days.

2. How many 3lb. parcels can be made from 13 cwt. 38 lbs.?

3. If a shot from a gun travels at the rate of 360 yards a second, how long will it take to travel 9 miles?

4. How many heaps of money, each containing a florin, a shilling, a sixpence, a penny, and a halfpenny can be made out of £8 6s. 9d.?

STANDARD V.—FIRST QUARTER.

1. What is the value of 7 sq. ft. 50 in. at 13s. 6d. per sq. yd.?

2. Find the cost of 3,079 chairs at £1 4s. 10¾d. each.

3. What would be the cost for 19 miles 29 chains at £7 11s. 8d. per mile?

4. What is the total value for 5,834 articles at 8s. 9½d. each and the same number at 10s. 7¾d. each?

SECOND QUARTER.

1. How much will be left out of an income of 700 guineas, after paying an income-tax of 5d. in the £?

2. Find the cost of draining a field of 29 ac. 1 ro., when a field of 3 ro. 36 po. costs £1 11s. 9d.

3. How many days will it take to pay a debt of £2 19s 3d. at 5s. 3d. every fortnight?

4. Bill:—

$9\frac{3}{4}$ lbs. of beef at 9d. per lb.;
$11\frac{1}{2}$ lbs. of mutton at $10\frac{1}{2}$d. per lb.;
17 chickens at 4s. 9d. a couple;
$12\frac{1}{2}$ dozen eggs at 1s. 6d. a score;
5 bladders of lard, each weighing $6\frac{1}{2}$ lbs., at $6\frac{1}{2}$d. per lb.;
$19\frac{1}{2}$ lbs. of cheese at $8\frac{1}{2}$d. per lb.

THIRD QUARTER.

1. Simplify:— $\frac{6}{7} - \frac{5}{6} + \frac{4}{5} - \frac{3}{4} + \frac{2}{3} - \frac{1}{2}$.

2. Find the sum of $\frac{7}{8}$ and $\frac{5}{6}$ and the difference between $\frac{3}{4}$ and $\frac{9}{10}$, and add the results.

3. A calf weighed 10 stone, and cost £5 10s. A butcher sold $\frac{3}{4}$ of it at 11d. per lb. and the remainder at $10\frac{1}{2}$d. per lb. What was his gain?

4. A man is 75 years old. His son is $\frac{8}{15}$ of his age, and his grandson $\frac{3}{5}$ of his father's age. How old is the grandson?

STANDARD VI.—FIRST QUARTER.

1. Reduce $\frac{4}{6}\frac{3}{7}\frac{6}{4}\frac{7}{5}$ to its lowest terms, and then divide it into seven equal parts.

2. Add ·0784 to the difference between ·3029 and ·329, and divide the sum by ·1$\dot{6}$.

3. What fraction must be added to $3\frac{5}{9} - 1\frac{17}{36} + 2\frac{1}{3} - \frac{11}{24}$ so as to make it a whole number?

4. A gentleman pays £134 2s. $2\frac{1}{4}$d. for income-tax at 9d. in the £. What is his income?

SECOND QUARTER.

1. What decimal of £5 15s. is ·368 of £1 10s.?

2. What is the smallest amount that may be added to £14 12s. 9d., so that an exact number of articles at 3s. $10\frac{1}{2}$d. each may be bought?

3. Give the difference in lbs. between ·015625 of a ton and ·08$\dot{3}$ of 3 qrs. 3 lbs.

4. A cask was $\frac{3}{4}$ full, and after 8 gallons had been added it was $\frac{5}{6}$ full. How much will the cask hold?

THIRD QUARTER.

1. Find the simple interest on £578 13s. 9d. for $3\frac{1}{2}$ years at $4\frac{5}{8}$ per cent.

2. A bankrupt's debts are £1,186 13s. 4d., and his assets are worth £337 9s. 2d. How much will his creditors lose in the £?

3. £425 was put into a bank at $4\frac{1}{2}$ per cent., and allowed to remain until it amounted to £558 17s. 6d. at simple interest. How long was it in the bank?

4. A certain sum was divided among A, B, and C. A received $\frac{5}{9}$ of it, B $\frac{1}{3}$ of A's share, and C £3 13s. 4d. What was B's share?

STANDARD VII.—FIRST QUARTER.

1. At what rate per cent. will the interest on £758 15s. amount to £34 2s. $10\frac{1}{2}$d in a year?

2. If the rent of $19\frac{1}{2}$ acres for 8 months is £24 5s. 4d., what will be the rent of $8\frac{1}{4}$ acres for $2\frac{1}{2}$ years?

3. Reduce ·0735 of three half-crowns to the decimal of two guineas.

4. If three men do as much work as 5 women, and 16 men can do a piece of work in 6 days of 9 hours each, in what time will 20 men do it working 8 hours a day?

SECOND QUARTER.

1. What will £896 13s. 4d. amount to in two years 8 months at $3\frac{3}{4}$ per cent?

2. A shopkeeper made an average profit of £7 15s. 6d. weekly for 7 weeks. The first week he gained £8 10s., and the second £6 18s. 9d. What was his average gain for the other weeks?

3. A man earned 35s. a week and spent ·625 on food, ·208$\dot{3}$ on rent, and 4s. 6d. on clothes. What fractional part of his wages had he left?

4. The average age of 15 men was 29 years. The average age of 8 was 27, and of 6 was 26. What was the age of the other man?

THIRD QUARTER.

1. There were 850 children in a school. One morning 14 per cent. were absent and 8 per cent. were late. How many were punctual?

2. If the simple interest on £568 15s. for 8 years amounts to £159 5s., what will be the simple interest on £397 10s. for 6 years at the same rate?

3. A grocer selling tea at 3s. 4d. per lb. gains 16 per cent. What is his gain or loss per cent. when sold at 2s. 6d. per lb.?

4. Divide £5 17s. 6d. between two persons, giving one 35 per cent. more than the other.

ANSWERS.

STANDARD I.

	First.	Second.	Third.
1.	666.	1,605.	2,110.
2.	503.	86.	75
3.	542.	106.	687
4.	352 slates.	52 nuts.	31 sheep.

STANDARD II.

	First.	Second.	Third.
1.	8,997.	3,672,000.	6,543 + 10.
2.	94,198.	13,047.	688.
3.	258,001.	9,705.	237,183,824.
4.	335 boys.	198 books.	116 nuts.

STANDARD III.

	First.	Second.	Third.
1.	1,052 + 24.	£4,702 7s. $7\frac{1}{2}$d.	£72,204 18s. $11\frac{1}{2}$d.
2.	870 times.	18 boxes.	£2.
3.	41,816,604.	£2,094 17s. $6\frac{3}{4}$d.	£91,685 17s. $0\frac{3}{4}$d.
4.	41 marbles.	£85.	£1 5s.

STANDARD IV.

	FIRST.	SECOND.
1.	£66,759 19s. 3½d.	119,240 yards.
2.	£3 8s. 9d.	19,296 pints.
3.	£3,030 10s. 8½d. + 21 q.	14,113,440 sq. in.
4.	7s. 6d.	£7 13s.

THIRD.

1. 3 days 12 hrs. 44 min. 39 sec.
2. 498 parcels.
3. 44 seconds.
4. 46 heaps.

STANDARD V.—FIRST.

1. 11s. 0½d.
2. £3,832 14s. 3½d.
3. £146 16s. 7¾d.
4. £5,669 18s. 4½d.

SECOND.

1. £719 13s. 9d.
2. £47 12s. 6d.
3. 158 days.
4. 7s. 3¾d. + 10s. 0¾d. + £2 0s. 4½d. + 11s. 3d. + 17s. 8¼d. + 13s. 9¾d. = £5 0s. 6d.

THIRD.

1. $\frac{1}{8}\frac{9}{1}$.
2. $1\frac{10}{45}$.
3. 16s. 10½d.
4. 10 years.

STANDARD VI.

	FIRST.	SECOND.	THIRD.
1.	$\frac{11}{111}$.	·096.	£97 17s. $10\frac{53}{60}$d.
2.	·627.	1s. 9d.	14s. 3¾d.
3.	$\frac{2+3}{3\frac{1}{3}\frac{3}{3}}$.	27¾ lbs.	7 years.
4.	£3,576 5s.	96 gals.	£4 11s. 8d.

STANDARD VII.

	FIRST.	SECOND.	THIRD.
1.	4½ per cent.	£986 6s. 8d.	663 children.
2.	£38 10s.	£7 15s. 11¾d.	£83 9s. 6d.
3.	·013125.	$\frac{1}{1}\frac{4}{3}$s.	13 per cent. loss.
4.	9 days.	63 years.	£2 10s. and £3 7s. 6d.

How a Scotch School was Examined.

INFANTS.

Singing.—(*a*) Modulator Exercise :—

d m m s d' m d d' s d' d t, d r l d' m r d.

(*b*) Song :—'Roll your hands.'

Object Lesson.—Infants and Standard I. questioned by teacher on 'Coal.'

Class I.—Reading.—A lesson was chosen from Chambers' Infant Reader, entitled 'The Funny Boy.' Every child read a short paragraph and at the end the class was questioned on lesson read. Then asked to spell such words as—clothes, seal, bear, wore, &c.

Writing.—Each child asked to write two capital and two small letters—also their names.

Arithmetic, Mental.—8 + 6, 7 + 4, 14 + 6. How many feet have four pairs of ducks? How much should I have if some one gave me 6d., some one 3½d., and I had 2d. in my purse? 13 — 7, 12 — 4, &c.

Class II.—Reading.—A lesson about 'A Bird's Nest' was chosen from Collins' Infant Reader. Every child read, then questioned on birds. No spelling.

Writing.—Wrote the same as Class I.

Arithmetic, Mental.—6 + 5, 5 + 7, 3 + 7, 7 + 6. How many legs have 3 cows? How many pennies in a shilling? 11 — 5, 10 — 4. Had 12 apples, gave 4 away, how many left?

Class III.—Reading.—Each child asked to read a line from Blackie's First Primer. Questioned on what was read, then asked to spell easy words, as—fox, cat, dog, &c.

Writing.—Wrote small letters—u, v, w.

Arithmetic.—4 + 3, 5 + 4, 6 + 4, 6 — 3, 8 — 4, 8 — 7. Had 6 marbles, lost 4, how many left?

Infants' Needlework.—Alternate children had hemming and knitting.

STANDARD I.

Reading. — One half of class read from Chambers' Graduated Reader and the other from Star Reader. Children questioned on what was read. Picked out nouns and answered questions.

Writing.—Class was divided into three groups, A, B, C, and each wrote a different line taken from the Star Reader.

Arithmetic.—

306	864	826
94	729	97
37	298	
670	876	729
945	943	
2,052	3,710	

Needlework.—Class was divided into three groups.—*A.* Hemming in two colours. *B.* Sew and fell. *C.* Knit 12 rows showing chain edge and cast off.

STANDARD II.

Reading.—The boys read from Chambers' Graduated, and the girls from Royal Star Reader. Intelligence was tested with closed books, and nouns, verbs, and some adjectives were found by a select few in the class.

Writing.—Copy books were examined, and the following lines were dictated by one of the teachers :—'Steam draws our railway trains; drives thousands of ships across the oceans and seas of the world; prints our books; weaves our wool.'

Arithmetic.—The pupils were placed back to back and the following sums were dictated once :—

1. 7,006 + 84 + 790 + 9,645 + 8,090 + 16 + 906.

2. From eight thousand and sixty-four take nine hundred and seventy-eight.

3. Multiply 86,437,259 by four.

MUSIC OF UPPER STANDARDS.

Modulator Exercises were given both by the Teacher and the Inspector, with one remove to both right and left.

Ear Exercise on Harmonium. — Played by the Inspector :—**d f l s; d r f m; r m f e s; s f e l s; s d' t a l; s t a l s.**

Sight Singing Test.—Key C.

d :-.d | m :s	d' :— | s :—	d' :-.d' | d' :r'	m' :— |— :	}
ᵗd :-.d | f :f	m :— | fe :—	s :d | m :r	ᵗs :— |— :	}
l :-.l | l :t	d' :— |— :—	r' :-.t | d' :r'	m' :— |— :	}
d' :s | d' :r'	m' :— | s' :f'	m' :— | r' :—	d' :— |	‖

Songs sung.—(1) 'Oh, where do fairies hide their heads?'

(2) 'The minute gun.'

(3) 'O gin I were a baron's heir.'

STANDARD III.

Reading.—Class books—Royal Star and Royal Scottish Readers. The whole class was examined from the former in reading, intelligence and grammar. Extensions of the predicate and enlargements of the subject and object were asked for. The lessons read were 'The truant Squirrel,' I. and II.

Dictation (read by the teacher):

'In the grey Arctic twilight my sledge was gliding swiftly over the snow, with the low huts I had left behind me scarcely seen in the distance. I drove on, mile after mile, enjoying very much my first reindeer drive in Lapland.'

Arithmetic, on cards:

A. (1) 456,780 × 9,078 (words).
(2) Divide 8,478,324 by 834.
(3) 790,576 ÷ 8,067 (words).
(4) Add together £21 3s. 5d.; £19 7s. 6½d.; £32 8s. 11¼d.; £31 2s. 10d. and £5 16s. 3d.

B. (1) 987,654 × 7,809 (words).
(2) Divide 5,609,912 by 83.
(3) Divide 973,944 by 108.
(4) Subtract 19s. 11¾d. from £2 17s.

C. (1) 876,594 × 9,807 (words).
(2) Divide 39,426,150 by 54.
(3) Divide one million by 954.
(4) Subtract £1,338 12s. 1d. from £10,000 0s. 2d.

Geography.—A teacher questioned the class on the boundaries of Scotland, the counties, rivers, lakes and mountains, after which the Inspector tested the pupils' knowledge of towns and manufacturing centres.

History.—Incidents connected with the life of Bruce till the battle of Bannockburn, and the closing scenes of the life of Queen Mary.

STANDARD IV.

Reading.—Books—Royal Star and Royal Scottish Readers. The lesson was taken from the former, and the one chosen was 'The Spider speaks for herself.'

Intelligence, *Grammar* and *Analysis* taken from the same lesson. One-third of the class answered on meanings of such words as nobodies, flaunting, industrious, &c. One-third did parsing and the rest analysis.

Dictation (read by one of the teachers):

'Perhaps the most interesting thing about us is the variety of our houses. I build my house in your garden or bushes; and if it were not for the impudence of your gardener, and a destructive instrument called a broom, you would see them oftener than you do. It does not become me to boast, but if you know of any residence more graceful or elegant than mine, I should like to know where it is.'

Arithmetic on cards:

A. (1) Multiply £1 9s. 7¾d. by nine thousand and one.
(2) Divide £602,010 12s 0½d. by 3,840.
(3) Multiply 30 tons 5 cwts. 3 qrs. by 16.
(4) Reduce 7,643,219 square yards to inches.

B. (1) Multiply £57 19s. 7¾d. by 426.
(2) Divide £701,020 11s. 7¾d. by 8,769.
(3) Reduce 1,362,400 halfpence to crowns.
(4) Reduce 932,718 days to minutes.

C. (1) Multiply 3s. 1½d. by 1,056.
(2) In £86 13s. 9d. how many threepences.
(3) Reduce 9,816 furlongs to inches.
(4) From 36 cwts. 2 qrs. 14 oz. take 17 cwts. 14 lbs. 15 ozs.

History. — Inspector began with Queen Anne, questioning a little on her family and descent, the wars of Marlborough and Prince Eugene, and wound up with a fairly exhaustive test of the pupils' acquaintance with the history of the Civil War.

Geography.—The teacher gave a lesson on the general geography of Ireland, and the Inspector questioned the class on the towns and manufacturing centres of England.

STANDARD V.

Reading.—Books—Royal Star and Royal Scottish Readers. Lessons taken from 'A Hero of Italy' and 'A Dutch Paradise.' The class was divided into three sections, one part answering on meanings of words and phrases, the second on grammar, and the third on analysis.

Writing.—The following story was *told* twice by the Inspector:—

Queer Glass.

'An English gentleman returned from India and brought home with him a Hindoo boy as servant. The boy had always lived in a hot country, and had never seen water in its solid form as ice. One winter morning he brought in from a bucket in the yard a large piece of ice. Running up to his master, he eagerly cried, "See, master, what a large piece of glass I have found." His master said that it looked very wet, and jokingly told him to put it in the oven to dry. The boy carried it away to the kitchen, but soon returned with the partly melted ice. He looked quite astonished as he entered his master's room. "Oh, master," he cried, "this is the queerest glass I ever saw. The more I dry it the wetter it gets."'

Arithmetic.—Sample card.

(1) Practice—9,007 articles at £2 16s. 10½d. each.

(2) Bill—37½ quires of paper at 3½d. per quire; 2,000 envelopes at 8½d. per hundred; 150 books at ½d. each; 19 dozen pencils at 6½d. per dozen.

(3) If 24 horses plough 210 acres in 9 days, how many horses will do the same in 36 days?

(4) Divide $4\frac{1}{4} + 3\frac{2}{5}$ by $\frac{7}{12}$.

Geography.—The map of New Zealand was drawn on slates after the paper work was finished, and oral questioning on Europe, physically and politically, as well as on Australia and New Zealand generally.

History.—The teacher examined the class on the reign of George II., the Inspector after that taking the American Civil War, its causes and leaders.

STANDARD VI.

Reading.—Class-books—Royal Star and Royal Scottish Readers. Lessons read from the former, 'A City of Northern Africa.' Parsing and analysis taken from the same lesson.

Subject of Essay.—'The study you like best,' in the form of a letter.

Arithmetic.—Sample card.

(1) Find the simple interest on £98 15s. 10d. for 5 months at 2½ per cent.

(2) What sum must be put out at interest for 9 months to gain £45 if £560 gains £14 in 5 months?

(3) What fraction of 4½ tons is $\frac{7}{8}$ of 2½ cwt.?

(4) Divide ·2301 by 53061·01 to seven places of decimals.

History.—The events of Victoria's reign in almost chronological order.

Geography.—Map of India, drawn on slates after completion of paper work. Questions on Asia generally, and on the British Colonies in all parts of the globe.

Repetition—

Standard III. 'Graves of a Household' and 'The Beggar-man.'

Standard IV. 'Village Blacksmith' and 'Burial of Sir John Moore.'

Standard V. 'The Sea King's Burial' (Mackay).

Standard VI. 'Lycius' (Stoddard); 'Parting of Marmion and Douglas' (Scott).

Needlework—

Standard II.

(*a*) Seaming and felling, showing a join in both.

(*b*) Knit 12 rows purl and plain and cast off.

Standard III.

(*a*) Stitching and sewing on a tape.

(*b*) Herring-boning and darning on canvas.

(*c*) Knit 10 rows of 30 stitches, breaking and joining the thread.

Standard IV.

(*a*) Put in a flannel patch two inches square.

(*b*) Gather and stroke seven inches, and set into a band three-and-a-half inches.

(*c*) Darn a square hole on stocking web material, and mark a letter on canvas.

(*d*) Cut and work a button-hole and sew on a button.

(*e*) Cast on 21 loops and knit with two pins 30 rows, showing seam stitch and three decreasings as for the back of a stocking.

Standard V.

(*a*) Turn down a hem ¾ in. wide, fix two tucks, and run at least half of one.

(*b*) Put in a calico patch two inches square.

(*c*) Knit heel of a stocking, turn it, and cast off.

(*d*) Cut out and tack together a child's pinafore.

(*e*) Darn a hole and mark a letter on linen.

(*f*) Put in a gusset as for the body of a shirt and stitch it.

Standard VI.

Cut out and tack together the pattern of a child's frock body, and cut and work a button-hole.

Tests in Mental Arithmetic.

STANDARD I.

1. What is the cost of 2 slates at 3d. each, and 2 table-books at 1d. each? 8d.

2. What would 4 slates cost at 2½d. each? 10d.

3. How much are 8d. and 10d.? 1s. 6d.

4. How many halfpence could you get for 1s. 2d.? 28.

5. How many farthings could you get? 56.

6. How many is that short of 100? 44.

7. If I had 44 nuts, and gave 8 each to 5 boys, how many should I have left? 4.

8. George had 17 marbles, he lost 9 and won 13; how many had he? 21.

9. How many marbles could you get for 2½d. at 6 a penny? 15.

10. A boy saved 5 sixpences and 4 threepenny pieces; how much had he? 3s. 6d.

11. How much more did he want to make half-a-sovereign? 6s. 6d.

12. If he saved sixpence weekly, how long would it take him to save that sum? 13 weeks.

STANDARD II.

1. How many tops could you get for a florin at 4 a penny? 96.

2. Divide them among 6 boys; how many is that for each boy? 16.

3. If two dozen oranges cost a florin, how much would a score and a half cost? 2s. 6d.

4. Take 9½d. from 2s. 6d.? 1s. 8½d.
5. What is the half of that? 10¼d.
6. How many are 3 times 4 times 6? 72.
7. Add 6, 9, 8, and 7. 30.
8. How many times can you take 30 nuts out of a bag containing 240? 8.
9. Add 5d., 6d., 7d., and 8d. 2s. 2d.
10. How much are six threepences and three sixpences? 3s.
11. If 2 lbs. of butter cost 3s., what will ½ lb. cost? 9d.
12. What will ¾ lb. cost? 1s. 1½d.

STANDARD III.

1. How many oranges could you get for a florin at two for 1½d.? 32.
2. What is the cost of 9 loaves at 3½d. each? 2s. 7½d.
3. What change would you get out of a double florin? 1s. 4½d.
4. If I wanted to buy 2 lbs. of beef at 9½d. per lb., how much more should I want? 2½d.
5. What would 5 oz. of tea cost at 2s. 8d. per lb.? 10d.
6. What would 7½ oz. cost? 1s. 3d.
7. What is the cost of 10 caps at 1s. 3d. each? 12s. 6d.
8. How many farthings would you get for that amount? 600.
9. Take away a tenth of that number, how many are left? 540.
10. Again take away a tenth, how many are left? 486.
11. How many times will a clock strike in a day? 156.
12. How many dozen are there in that number? 13.

STANDARD IV.

1. What is the cost of 18 tons of coal at 6d. a cwt.? £9.
2. What would 13 cwt. cost at £2 a ton? £1 6s.
3. How many inches are there in 2 yds. 7 in.? 79.
4. How many yards are there in 54 in.? 1½.
5. If 1½ yards of ribbon cost 1s. 6d., what will 5½ yards cost? 5s. 6d.
6. What would 8¼ yards cost? 8s. 3d.
7. Divide a sovereign among 60 children; how much is that for each child? 4d.
8. What part of 4½ cwt. is 2 qrs.? ⅑.
9. A newsagent gains 3d. on a dozen penny papers. How much does he gain on 40 papers? 10d.
10. How many must he sell to gain 1s. 2½d.? 58.
11. What is the cost of 5 dozen and 3 oranges at 7 for 3d.? 2s. 3d.
12. How often will a 5 feet wheel turn in going 45 yards? 27 times.

STANDARD V.

1. What is the cost of half-a-mile of ribbon at 3d. a yard? £11.
2. What is the cost of 3 cwt. at 6d. per lb.? £8 8s.
3. What is the cost of 5 lbs. at 1¼d. per ounce? 8s. 4d.
4. What is the cost of 8 stone at 3d. a lb.? £1 8s.
5. What would 450 nails cost at 9d. a hundred? 3s. 4½d.
6. How much would one article cost at £2 5s. per gross? 3¾d.
7. How many are $\frac{5}{18}$ of a gross? 40.
8. What is ½ of ⅓ of half-a-guinea? 2s. 7½d.
9. If I have a slate 10 inches by 8 inches, and a farthing be placed on each square inch, how much shall I have? 1s. 8d.
10. Add together ⅜ and $\frac{7}{8}$. 1$\frac{5}{8}$.
11. If 12 horses eat 18 pecks, how many horses will eat 15 pecks? 10.
12. What is the interest on £325 for 7 years at 4 per cent? £91.

STANDARDS VI. AND VII.

1. Express the sum of ¼ and ⅛ as a decimal. ·45.
2. What is the value of ·8 of three half-crowns? 6s.
3. Add together ·75 of £1, ·75 of 1s., and ·75 of 6d. 15s. 10½d.
4. What fraction multiplied by itself will give $\frac{64}{81}$? $\frac{8}{9}$.
5. What decimal divided by ¾ will give $\frac{8}{9}$? ·$\dot{6}$.
6. A man does ⅔ of a piece of work in 5 days; how long will it take him to do the whole work? 12½ days.
7. In a school ⅓ are boys, ¼ girls, and there are 250 infants. How many children are there in the school? 600.
8. In what time will £100 gain £21 at 3½ per cent.? 6 years.
9. At what rate per cent. will £250 gain £6 5s. in a year? 2½ per cent.
10. What percentage of half-a-crown is a florin? 80 per cent.
11. A grocer bought 6 lbs. of tea for a sovereign. At what price per lb. must he sell it to gain 10 per cent? 3s. 8d.
12. If he lost 15 per cent., what was the selling price per lb.? 2s. 10d.

How my School was Examined.

BY THE HEAD MASTER OF A COUNTRY MIXED SCHOOL.

INFANTS.

Arithmetic.—Add together 29 + 36 + 18 + 75. Ans. 158.

Spellings.—Bell, Sing, Dog, Boys, Play, Mary.

STANDARD I.

Arithmetic.—1. Add together 904 + 586 + 397 + 410 + 999.
2. From 806 take 59.
3. Take 138 from 834.
Answers.—(1) 3296. (2) 747. (3) 696.

Writing.—The following words were dictated :—

Harvest, Sweet, Dreaming, Railway, Field, Strong, Mutton, Round, Leaf, Soap.

Recitation.—'Which loved best ?'

Mental Arithmetic.—4 times 6 ? Tell me what else will make 24 ? How many doz. in 24 ? Add 3 and 3 and 3. Add 3 and 3 and 0. 6 oranges at 2 for 2d. If I had 32 nuts and I divided them among 8 children, how many would each receive ? How many three-penny pieces in one shilling ? How many fourpences in a shilling ? What is a 2s. piece called ? How much is half a crown ? Divide a florin among 4 girls ; how much each ? How many florins in 10 shillings ? How many in £2 ? Add together 1 score and half a doz. Add 2 score and 1 doz. 2 doz. pens at a halfpenny each. 2 doz. and a half at 2 for 2d. How many marbles will 6 boys have if each boy has 7 ? Add 3 to 9 times 3. How many score in 30 ? Twice 2½d. Half of 13d. Half of 40, 28, 60, &c.

Geography (Map of England placed before class).—What is this ? What is a map ? What is it a map of ? (England). Which is the north, south, east and west ? What is between east and west ? What is a piece of land surrounded by water called ? What is this ? (A Cape). What are these ? (Pointing to mountains). What are those white things marked on the map ? (Ships). Show me a ship. Are they on the land or the water ? What is this ? (The Sea). What kind of water—fresh or salt ? What is a piece of water running a long way into the land called ? (A Gulf). What is this ? (Land). What are these ? (Rivers). Show me another river. Where does a river generally begin ? What is the beginning called ? Where does it run to ? Is a river salt or fresh water ? What is this land next the sea called ? Which is the highest, a hill or a mountain ? Tell me the names of some hills. What is the top of a mountain called ? the bottom ? What do these black dots stand for ? (Cities and towns). What is this ? (A Plan). What is it a plan of ? Show me the school. What is this ? (A Window). What are these marks for ? (The Gallery). What are these ? (Desks). Show me the door leading from the school-room to the class-room. Which is the fire-place ? Which is the north of this room ? How could I find the north in the daytime ? How could I find it by the sun ? Where is the sun at dinner time ? Then how could I find the north ? With what else could I find the north ? (Compass). Which way does the hand or needle point ? What is it made of ? Who use it ? (Sailors). When do they use it ? (When at sea). What else could I find the north by ? (The North or Pole Star).

STANDARD II.

Arithmetic.—1. Add together 8,005 + 750 + 10,689 + 12,016 + 88 + 7,907 + 58,076.

2. Multiply 57,340 by 608.

3. Take 79,030 from 80,013.

4. Divide 21,206 by 9.

Answers : (1) 97,531. (2) 34,862,720. (3) 983. (4) 2,356 + 2.

Dictation.—'Well, I am going to have one, if you will be my partner,' replied Uncle Jack. 'Now, let me give you three rules for making sunshine :—First, Do not think what might have been if the day had been better. Second, see how many pleasant things there are left to enjoy.'

Geography.—What is the earth made of ? What shape is it ? How do you know it is round ? If we could walk round it, what name would be given to this distance ? Name given to distance through the earth ? How many miles is this ? What is an ocean ? Name some oceans. Where does the Arctic Ocean lie ? What is the ocean called opposite to it ? Which ocean do we know most about ? What great continent lies on the other side of the Atlantic ? Name any article we get from this continent. Which continent is of most importance to us ? Why ? Name some country in Europe which is a peninsula. What sea separates us from Europe ? What ocean is this a part of ? Name any large river you know flowing into the Atlantic Ocean. What ocean would you cross in going to Australia ? What is a river ? What is the difference between the beginning and end of a river ? What is either side of a river called ? How can you tell the right bank from the left ? Point out a tributary on the map of England, and give a definition of it. The name given to the land on either side drained by a river ? Point out on map of England a lake, and give definition.

Mental Arithmetic.—How many dozen oranges in 144 ? How much would the lot cost at ½d. each ? How much would be gained by selling them at ¾d. each ? What is the half of 100 and of 144 ? ¼ of 100 and of 144 ? Add together 13, 14, 15, and 16. How many tens in this number ? Take away all the tens, how many are left ? Out of 2s. 6d. I spend 1s. 6d., how much is left ? If I had three sixpences and a three-penny piece given to me, what amount should I have ? How many books at 3d. each could I get with this money ? How many sixpenny ones ? How much does 26 pence amount to ? 26 sixpences ? 26 shillings ? What is a sovereign ? Half a sovereign ? If I give 2s. each to a class of 20 children, what amount of money should I give ?

Grammar.—Children selected the whole of the nouns from a paragraph in their reading book. They were then asked what enabled them to select these words in particular from the others. Kinds of nouns were asked for. Child asked its name, was this a proper or a common noun ? and was then asked to give a common name instead of the particular name given. Definition of a verb required ; name some verbs which express being ? Verbs then selected from a paragraph in reading book.

Recitation.—'We are Seven.'

STANDARD III.

Arithmetic.—Boys—1. Divide 768,003 by 247.

2. Add together £7,069 18s. 8¾d., £738 12s. 7½d., £79,004 10s. 8d., £635 13s. 10½d., £3,038 15s. 2d.

3. Take £313 10s. 2½d. from ninety thousand and ninety pounds.

4. If I had 365 bags, each containing 12 nuts, and I divided them among 590 children, how many would each receive ?

Girls—1. Multiply 308,406 by 308.

2. Add together £407 6s. 2½d., £3,004 17s. 6½d., £96 12s. 7¾d., £40,006 16s. 11¾d., £203 14s. 8½d.

3. Take £1,909 19s. 7½d. from ninety thousand and nine pounds and one farthing.

4. 72 men had 5,960 sheep. They sold 900, and the remainder were equally divided among them; how many did each have?

Answers.—*Boys*—(1) 3,109 + 80. (2) £90,487 11s. 0¾d. (3) £89,776 9s. 9½d. (4) 7 + 250. *Girls*—(1) 94,989,048. (2) £43,719 8s. 1d. (3) £88,099 0s. 4¾d. (4) 70 + 20.

Dictation.—The trunk of the elephant is about eight feet long. It can be made shorter or longer as the animal chooses, and can be moved with great ease in every possible direction. It has such prodigious strength that it can knock down a man with it, and pull up trees of moderate size by the roots.

Geography.—What island do we live in? What other countries form part of this island? What other island lies to the west of Great Britain? What part of Great Britain is nearest to Ireland? What piece of water lies between these two countries? What river drains the western counties of England? What kind of farming is mostly found in these counties? What promotes the herbage in the western counties more than in the eastern? What is the meaning of the word Cheshire? What mineral is obtained in this county? Name some of the salt towns. What great manufacturing district are we near to when in Cheshire? Name given to this district? Name some towns in the Potteries. What is the occupation of the people in South Staffordshire? Where is the largest iron smelting district? The principal town? What is smelted at Swansea? By what railway must I have travelled to reach your school? How far does this system extend?

Mental Arithmetic.—If I remain in school from half past ten to 4 o'clock, how many hours should I have stayed? How many half hours? How many ¼ hours? 5½ hours per day, how many would this be for a week? What is the half of 100? How many times is 1000 greater than 100? A million is how many times greater than a thousand? What is half a thousand? ½ of 1 million? 500 thousand shillings; how much would this be in pounds?

Grammar.—The parts of speech were taken from Reading Book, each child picking out such parts in turn. The plural of nouns and the person of pronouns were asked for. Children were then called upon to form sentences, using some of the more difficult nouns as subjects, and to these sentences they were afterwards asked to add an adverb of their own selection. Different kinds of adjectives were taken. Finally kinds of adverbs and sentences containing some of these were required.

Recitation.—'After Blenheim.'

STANDARD IV.

Arithmetic.—Boys.—(1) Multiply £594,160 18s. 4½d. by 184.

(2) How many sq. poles in 1,648,019 sq. inches?

(3) Divide £76,403 16s. 5¾d. by 19.

(4) Divide a £5 note between a man and a woman; the man giving half-a-crown to the woman out of his share. How much will each receive?

Girls.—(1) Bring 690,016 inches to miles.

(2) Divide £6781 9s. 8½d. by 45.

(3) Multiply £768 14s. 10½d. by 143.

(4) A horse and cart are worth together £112. The horse was worth 3 times as much as the cart. What was the value of each?

Answers.—*Boys.*—(1) £109,325,609 1s. (2) 42 pls. ½ sq. yd. 5 sq. ft. 83 sq. in. (3) £4021 5s. 0¾d. + 14. (4) Man's Share £2 7s. 6d.: Woman's Share £2 12s. 6d.

Girls.—(1) 10 mls. 7 fur. 4 pls. 5 yds. 4 in. (2) £150 13s. 11¾d. + 31. (3) £109,930 7s. 1½d. (4) Horse £84: Cart 28.

Dictation.—There is a form of dishonesty sometimes practised among the young. A boy or a girl at school 'copies' from a neighbour's slate or book. This is cheating—it is dishonest. The work is the property of the scholar who produced it, and to copy it is to steal. To show it to the master as if it had been done by yourself, is to tell a lie. Scorn to be guilty of such conduct. Be faithful and true in all things.

STANDARDS IV., V., VI., AND VII. (Standard V. course).

Geography.—What is longitude? From where do we measure our longitude? From where in Ireland? What is latitude? What place does the following stand for — 51° 28′ 38″ N.? Name the most northerly town in Scandinavia. What is its latitude? What town is called the cod liver oil port in Scandinavia? Present capital of Norway? former capital? What is the occupation of the people of Sweden? What mineral is found in this country? Where is it sent to? What Yorkshire port would trans-ship it for Sheffield? What is the most important town in this country? Name in turn the various parts of the Atlantic through which we would sail in going from London to the Mediterranean? Why don't sailors like to pass through the Bay of Biscay? What causes this water to be stormy? What country should we pass after leaving the Bay? What is the capital of Portugal? What do you know about its situation? What port famous for its wine lies to the north of the capital? On what river? Name given to the headland forming the north-west corner of the peninsular? Meaning of Finisterre? Before entering the Mediterranean what strait do we pass through? Fortress on the strait? To whom does it belong? Meaning of Mediterranean? Why so called? Name the islands in the Mediterranean? The largest of the Balearic Islands? To what country does Corsica belong? To what country Sardinia? What countries possess the seaboard on the west of the Adriatic? Meaning of Adriatic? Ports of Austria? An Italian port on the Adriatic? Capital of Italy? What river drains Austria and Hungary? Which is the most fertile part? Capital of Hungary? What mountains does the Danube flow between after leaving Austria? What is this part called before reaching the sea? What other countries are drained by this river? Name given to these states? Towns on the river belonging to the Danubian States? What do you know about Belgrade? Name given to the southern part of the Balkan Peninsula? Why called Morea? Islands off the coast of Greece? Meaning of Cyclades? What peninsula lies to the

south of Russia? What sea to the east of this peninsula? Straits between this sea and Black Sea? Sea to the east of the sea of Azov? River flowing into the Caspian? Port at its mouth? Capital of Russia? How situated? Why built in such a position? Former capital? An older capital still? An older one than this? Cause of these changes?

Mental Arithmetic.—What is $\frac{1}{3}$ of a ponnd? How many times is 6s. 8d. contained in a sovereign? Cost of 21 cwt. of sugar at 6s. 8d. a cwt.? What is $\frac{1}{8}$ of a pound? Which is the greater $\frac{1}{3}$, or $\frac{1}{8}$ of a pound? How many quarters in $30\frac{1}{4}$. How many wholes in 121 quarters? 11 halves, how many wholes? 3 wholes and 10 halves, how much? Multiply 15 quarters by 6. What is the answer in whole numbers?

Grammar.—Questions were asked on the formation of a sentence. What is the principal word, one that can not be omitted? A sentence was cut down by children until the verb only was left. The word *in* parsed orally as a preposition. A sentence asked for with *in* as an adverb? *Slow* to be used as an adverb and verb. Degrees of comparison of adverbs? How formed? What other part of speech can be compared? Give a sentence, using the adjective in its positive form? comparative? superlative? Name the various kinds of pronouns. What is a relative pronoun? What do you understand by mood? How many kinds of moods do you know? Name them. Conjugate *slow* in the potential mood. What do you understand by tense? Use the verb *slow* in the future tense. In the future perfect tense. A sentence was then parsed orally by a few children selected from the class.

Recitation.—Standards IV., V., VI., VII. 'Edinburgh after Flodden.'

STANDARD V.

Arithmetic.—Boys.—1. 9,058 articles at £13 9s. $4\frac{1}{2}$d. each.

2. Take 3 times $(\frac{7}{10} - \frac{3}{8})$ from 10 times $(4\frac{1}{4} - 3\frac{1}{8})$.

3. If $85\frac{1}{2}$ tons are led in one day by 9 horses, how many horses will it take to lead 475 tons in one day?

4. Make out the following bill:—$14\frac{3}{4}$ doz. bottles of gin at 3s. 6d. each; 9 bottles of brandy at 34s. per doz.; 17 doz. of port at 31s. 6d. per half doz.; 36 doz. of sherry at $3\frac{1}{2}$ guineas per doz.; 110 bottles of claret at 35s. per doz.

Girls.—1. Work the following sum $\frac{3}{8} + \frac{2}{3} - \frac{1}{2} + \frac{5}{6}$.

2. How long will 2,100 men be in eating a quantity of bread, if 143 men eat it in 154 days?

3. 17,094 articles at £1 17s. $5\frac{1}{2}$d. each.

4. Make out the following bill:—$13\frac{1}{2}$ lbs. at £3 per lb.; 1,550 pencils at 1d. for 10; 54 doz. at 1s. 8d. per doz.; 3 doz. hats at 1s 4d. each; 57 books at 6s. 9d. each.

Answers.—*Boys.* (1) £121,999 18s. 9d. (2) $10\frac{1}{4}\frac{1}{6}$. (3) 50 horses. (4) £30 19s. 6d. + £1 5s. 6d. + £53 11s. + £132 6s. + £16 0s. 10d. = £234 2s. 10d.

Girls. (1) $\frac{9}{16}$. (2) $10\frac{73}{150}$ days. (3) £32,015 12s. 9d. (4) £40 10s. + 12s. 11d. + £4 10s. + £2 8s. + £19 4s. 9d. = £67 5s. 8,

Composition.—A short story read over twice by the Inspector.

Mental Arithmetic.—What is the number of halves in 8 + 10 + $\frac{1}{2}$? What is $\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{1}{4}$? How many $\frac{1}{10}$ths. would it take to make one whole? Half of it? What do you mean by a fraction? How many kinds of fractions have you heard of? What is a decimal fraction? How many tenths would constitute a half? How is a half written in decimals? $\frac{3}{4}$, how is this written? Add together ·5 + ·75? Multiply your answer by two. What part of 12 is ·1?

Grammar.—What is a sentence? What do you understand by the subject of a sentence? How may the subject be enlarged? Give an example of an enlargement by means of a prepositional phrase by a participial phrase. What is meant by the object? What other forms of object have you besides that following a transitive verb? Of what different parts of speech may the object consist? A sentence from the repetition prepared was then parsed orally by the class.

STANDARD VI.

Arithmetic.—Boys.—(1) If $4\frac{1}{3}$ cwt. of sugar cost £$7\frac{5}{8}$, what will $7\frac{3}{4}$ cwt. cost?

(2) Find the amount on £1,725 for 5 months @ $4\frac{3}{5}$ %.

(3) Divide 296·750,246 by ·0494.

(4) Reduce 80 poles to the decimal of $\frac{3}{4}$ of a mile.

Girls.—(1) If $\frac{2}{3}$ of a steamer is worth £2,101 1s., what amount should I pay for a $\frac{5}{7}$ share of the whole ship?

(2) Find the simple interest on £625 for 73 days @ $4\frac{1}{2}$ per cent.

(3) Simplify $\frac{4\frac{2}{5}}{1\frac{5}{6}} \div \frac{3\frac{2}{3}}{8\frac{3}{9}}$

(4) A man who possessed ·6 of an estate sold $\frac{3}{4}$ of his share for £2,000. What is the value of the whole estate?

Answers.—*Boys.*—(1) £13 14s. 6d. (2) £1759 10s. (3) 6007·09. (4) ·$\dot{3}$.

Girls.—(1) £2,701 7s. (2) £5 12s. 6d. (3) $2\frac{2}{3}$. £4,444 8s. $10\frac{2}{5}$d.

STANDARDS VI. AND VII.

Mental Arithmetic.—1s. in the £, what percentage is this? What is 25 % of £10? What is ·$\dot{3}$ of £1? Find the interest on £250 for 6 months @ 5 %. Sold goods @ 6d. which cost $4\frac{1}{2}$d., what was the gain %? If the goods had been sold for 10s., gaining a similar per centage, what would have been their first cost? What is the value of ·25 of 1/-? How long will it take money to double itself at 5 %?

STANDARD VII.

Arithmetic.—Boys.—(1) What will be the carriage of $7\frac{1}{2}$ cwt. for 58 miles, if £1 15s. is the cost of $2\frac{1}{2}$ cwt. for 145 miles?

(2) If the cost of keeping 837 men for a fortnight was £7384 10s., how many men could be kept for 22 days for £8370?

(3) If goods which cost £$7\frac{7}{8}$ were sold at a gain of $41\frac{2}{3}$ %, what were they sold at?

(4) If 3 lbs. of a mixture were bought for 3s. 2d., 3s. 4d. and 2s. 6d. respectively, and the mixture was sold for 3s. 6d. per lb., what was the amount of money gained by selling one cwt. of the mixture?

Girls.—(1) The material for 5 dresses cost £2 $\frac{1}{3}$ and the making 65% of the cost of the material. What was the amount of the material and making?

(2) A toy dealer bought skipping ropes @ 2s. 3d. per doz.; he sold them at 3$\frac{1}{2}$d. each. What was the rate of his gain per cent.?

(3) If the rent of 35 cottages is £122 10s. for 14 weeks, what would be the rent of 76 cottages for 26 weeks?

(4) A man's property was worth £312. He owed one man £630; another £435, and another £412. What ought the third creditor receive?

Answers.—*Boys.*—(1) £2 2s. (2) 603$\frac{4}{6}\frac{3}{0}\frac{2}{1}\frac{0}{7}$ men. (3) £11 3s. 1$\frac{1}{2}$d. (4) £2 16s.

Girls.—(1) £3 8s. 9d. (2) 55$\frac{5}{9}$%. (3) £494. (4) £87 0s. 7$\frac{461}{1477}$.

Composition.—Standards VI. and VII. Boys.—'Life of George Stephenson.'

Girls.—'A day at Home when Mother's away.'

Grammar.—What is meant by a complex sentence? Give an example of a complex sentence having a subordinate noun clause; adjective clause; adverbial clause. How many kinds of simple sentences are there? Give an example of an Interrogative simple sentence. Give the prefix or affix in the following; *locomotive, porter, native, panorama, economy, independent, vagrant,* and *favourite.* Which of these are Latin?

—o—

Model Answers to Pupil Teacher Examination Papers.

OCTOBER, 1889.

END OF SECOND YEAR.

Euclid.

BOYS ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as −, +, ×.]

(*Answer two questions, including Question 3, if you can do so.*)

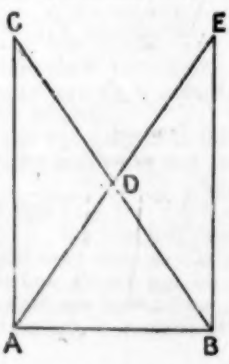
1. The greater angle of every triangle is subtended by the greater side, or has the greater side opposite to it.

Euclid, Book I., Prop. 19.

2. If two triangles have two sides of the one equal to two sides of the other, each to each, but the base of the one greater than the base of the other, the angle contained by the sides of that which has the greater base, shall be greater than the angle contained by the sides equal to them, of the other.

Euclid, Book I., Prop. 25.

3. In the triangle ABC right-angled at A, BC is double of AB; show that the angle B is double of the angle C.



Bisect CB in D. Join AD and produce to E. Join EB. Then △ ADC = △ BDE (I. 4) and angle DBE = ∠ DCA, and they are alternate angles. Therefore CA is parallel to BE (I. 27).

∴ ∠ ABE is a right ∠.

∵ CA = EB, and AB is common, and ∠ CAB = ∠ ABE, ∴ ∠ EAB = ∠ CBA. ∴ AD = DB, and also CD. ∴ ∠CAD = ∠ DCA. But ADB = CAD and DAC. ∴ ADB = twice DCA, and ∠ DBA = ADB, ∴ ∠ DBA = twice ∠ DCA.

Q.E.D.

Arithmetic.

GIRLS ONLY.

(*Do three questions only, including the last, if you can.*)

1. (*a*) Resolve 5043 and 20160 each into its prime factors and thence deduce the G.C.M. of the above two numbers.

(*b*) Divide out 12453 by 224, using short division and simple factors; and bringing out clearly each remainder.

2. Reduce $\frac{1}{40}$, $\frac{3}{8}$ and 8$\frac{11}{80}$ to decimals.

3. A man spent $\frac{3}{5}$ of his money and then found that $\frac{2}{3}$ of the remainder was 5s. How much had he at first?

4. Simplify—

$$\frac{4\left(2\frac{1}{3}\times 1\frac{1}{7}+\frac{2}{8}\right)}{3+\frac{2}{5-\frac{2}{7}}} \text{ of 8s. 5d.}$$

(1) (*a*) 5040 20160

$= 10 \times 504 \quad 10 \times 504 \times 4$

$(2 \cdot 5 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 7)$

∴ G.C.M. $= 10 \times 504 =$ 5040

(*b*) $224 = 4 \times 7 \times 8$.

Units 4	12453
fours 7	3113 + 1 unit = 1
28's 8	444 + 5 fours = 20
224's	55 + 4 28's = 112
	remr. = 133

(2) $\frac{1}{40} = \frac{\cdot 1}{4} =$ ·025

$\frac{3}{7} =$ ·428571

$8\frac{11}{80} = \frac{88}{10000} = \frac{1760}{100000} =$ ·00176.

(3) $1 - \frac{3}{5}$ spent $= \frac{2}{5}$ left.

$\frac{2}{5}$ of $\frac{2}{3}$ or $\frac{4}{15}$ = 5s.

∴ $\frac{1}{15} = \frac{5}{4}$

and $\frac{24}{25} = \frac{5 \times 25}{9}$

$= 13\frac{2}{9}$s. = 13s. 10$\frac{2}{3}$d.

(4)

$$\frac{4\left(2\frac{1}{3}\times 1\frac{1}{7}+\frac{2}{8}\right)}{3+\frac{2}{5-\frac{2}{7}}} \text{ of 8s. 5d.}$$

$$= \frac{4\left(\frac{7}{3}\times\frac{8}{7}+\frac{2}{8}\right)}{3+\frac{2}{4\frac{1}{7}}} \times 101.$$

$$= \frac{4\left(\frac{8}{3}+\frac{2}{8}\right)}{3+\frac{14}{29}} \times 101.$$

$$= \frac{4\left(\frac{34}{6}\right)}{3\frac{14}{29}}$$

$$= \frac{136}{6} \times \frac{29}{101} \times \frac{101}{1}$$

$= 406$d.

$=$ £1 13s. 10d. Ans.

Arithmetic.

BOYS ONLY.

(*Answer three questions only, including the last, if you can.*)

1. If 120$\frac{5}{16}$ bushels of oats feed 8 horses for 13$\frac{3}{4}$ days, how long will 26 horses take to consume 682$\frac{1}{2}$ bushels?

2. If the interest on £1,300 for 5 months is £24 7s. 6d., what is the rate per cent. per annum?

3. In a book on arithmetic an example was printed thus:—'If 42^{a} yards cost £12, how much will 114 yards cost?' the denominator of the fraction being accidentally omitted. The answer at the end of the book was £32. Find the missing denominator.

4. Explain the terms *stocks*, *par*, *brokerage*, *dividend*. What is the price of $2\frac{3}{4}$ per cent. stock if an investment of £1,895 5s. produces an income of £52 5s.?

(1) dys. dys.
Horses 26 : 8 :: $13\frac{3}{4}$: x
Bush. $120\frac{1}{8}$: $682\frac{1}{2}$
$x = \frac{1}{1\frac{1}{8}} \times \frac{1\frac{1}{8}}{1\frac{1}{2}} \times \frac{8}{1} \times \frac{13\frac{3}{4}}{1} \times \frac{4\frac{1}{4}}{1}$
$= \underline{24}$ days. Ans.

(2) £ £
£1,300 : 100 :: $24\frac{3}{4}$: x
Mos. 5 : 12
$x = \frac{100 \times 12 \times 195}{1300 \times 5 \times 8}$
$= \underline{4\frac{1}{2}}$. Ans.

(3) yds yds.
£32 : 12 :: 114 : x
$x = \frac{114 \times 12}{32}$
$= 42\frac{3}{4}$.
∴ The missing denominator was $\underline{4}$. Ans.

(4) *Stocks*—the money borrowed by any Government to carry on its affairs. The capital of railway or trading companies is sometimes called *stock*.

Par; when the actual money value of stock or shares is the same as the nominal value, the stock or the share is said to be at par.

Brokerage is the amount charged by a broker for buying or selling shares.

Dividend is the interest paid on any stock or share; or the amount received by a creditor out of a bankrupt's estate.

Number of cents. of stock bought
$= \frac{52\frac{1}{4}}{2\frac{3}{4}} = 19$
∴ £1,900 : £100 :: £1,895¼ : $\underline{£99\frac{3}{4}}$.

English Grammar and Composition.

BOYS AND GIRLS.

(*Answer questions* 1 *and* 2, *and two others.*)

1. Paraphrase this passage:—

I am *monarch* of all I *survey*,
My right *there is* none to dispute;
From the centre all round to the sea
I am lord of the fowl and the brute.
O Solitude! where are the charms
That sages have seen in thy face?
Better dwell in the midst of alarms
Than *reign* in this horrible place.

2. Parse the words printed in italic, and analyse the *last* four lines.

3. Tell the meaning and use of the final syllable in each of the following words, and say from what language each is derived:—Lead*er*. Lambk*in*. Clari*fy*. Regul*ar*. Famo*us*. Sal*ine*. Conversa*tion*. Execu*trix*.

4. Put each of the following words into a sentence, so that it shall be followed by an appropriate preposition:—

Different.	Adjacent.	Reconcile.
Conversant.	Absolve.	Dissent.

5. Give some examples of *collective nouns*, and say which of them should be followed by a singular and which by a plural verb. Give your reason.

(1) I am the king over everything which can be seen, and there is not another human being to claim sovereignty with me; my power extends over every living creature from the centre of the island to its circumference. Yet the place is horrible to me, and it would be better to live in constant fear of others than be king here. I ask in vain for the charms which wise men claim to have found in solitude.

(2) *Monarch*—noun, com., masc., sing., 3rd, nom. after 'am.'
survey—verb, reg., trans., act., ind., pres., 1st, sing., agreeing with 'I.'
there—pronominal adverb, mod. 'is.'
is—verb, irreg., intrans., act., ind., pres., 3rd, sing., agreeing with 'person' und.
that—rel. pro., neut., plur., 3rd, obj., gov. by 'have seen.'
sages—noun, com., masc., plur., 3rd, nom. to 'have seen.'
have—verb, aux. to 'seen,' indicating perf. tense.
seen—past part. of 'to see.'
have seen—verb, irreg., trans., act., ind., perf., 3rd, plur., agreeing with 'sages.'
O solitude, nom. of address.
(*a*) Where are the charms. [Princ. sent.]
Subj.—The charms
Pred.—are where.
(*b*) That sages have seen in thy face. [Adj. sent. to *a*].
Subj.—Sages
Pred.—have seen
Obj.—that
Ext. of Pred.—in thy face (place).
(*c*) Better dwell in the midst of alarms. [Princ. sent.]
Subj.—[It] to dwell in the midst of alarms
Pred.—[is] better.
(*d*) Than reign in this horrible place.
Subj.—[It] to reign in this horrible place
Pred.—[is good].

(3)

	Syllable.	Meaning and Use.	Language.
Leader	... er	Signifying agent; forms noun from verb.	E.
lambkin	... kin	diminutive: forms noun from noun.	E.
Clarify	... fy	to do or to make; forms verb from adj.	L.
Regular	... ar	belonging to, forming adj. from noun.	L.
Famous	... ous	full of; forming adj. from noun.	L.
Saline	... ine	belonging to; forming adj. from noun.	L.
Conversation	ation	denotes the action; forms abstract noun.	L.
Executrix	... trix	denotes agent; forms feminine gender of noun.	L.

(4) This is very different *from* that.
The tower is adjacent *to* the river-gate.
I tried to reconcile the statement *with* those previously made.
I am not conversant *with* the language of the country.
He cannot absolve you *from* your vow.
We must dissent *from* the conclusion you have arrived at.

(5) The use of a collective noun in the singular or plural number is determined by the thought in the mind of the speaker.
If the thought of the multitude is uppermost in the mind, the verb used is singular; as
The congregation quickly dispersed.
The audience was excited.
The flock is passing over our heads.
The army is defeated.
But if the thought of the individuals composing the multitude is uppermost, the verb used is plural, as;
The congregation were in a quiet frame of mind.
The audience were soon silenced.
The flock were scattered hither and thither.
The army were demoralized.

Geography.

BOYS AND GIRLS.

(*Answer three questions only.*)

1. Draw a map of—
(*a*) The Southern Coast Line of Europe;
or (*b*) Balkan Peninsula.

2. State the position as accurately as you can, and say what you know of each of the following places:—Bangalore, Cracow, Innsbruck, Rangoon, Sophia, Trincomalee, Varna, Valetta.

3. Gibraltar is situated in 36° 8′ N. latitude, and 5° 20′ W. longitude. Find (*a*) its distance in miles from the equator, (*b*) the time there when it is noon at Greenwich.

4. Mention the principal rivers flowing into the North and Baltic Seas; say where they rise, and what important towns are situated on their banks.

5. What are the chief exports of India? Give some account of its Government, and mention the names of some of the States not directly subject to British Government.

(2) *Bangalore*, a district, also a large fortified town in the province of Mysore, British India; the town has about 150,000 inhabitants.

Cracow, on the left bank of the Vistula, in Austria-Hungary, former capital of Poland; has university and cathedral; celebrated salt mines in neighbourhood.

Innsbruck, capital of the Tyrol, in Austria, on the river Inn; university.

Rangoon, capital of a district of same name in British Burmah, 26 miles from mouth of Irrawady; taken by British in 1852.

Sophia, a town in Bulgaria, on the river Isker, manufactures woollen and silk goods, leather and tobacco.

Trincomalee, seaport on N.E. coast of Ceylon with strong fortress and good harbour.

Varna, seaport of Bulgaria, on Black Sea; considerable trade.

Valetta, capital of Malta, on N.E. coast, strongly fortified, good harbour, taken by English in 1801; great trade.

(3) Distance from Equator—

$$\begin{aligned} &36\tfrac{5}{60}^{\circ} \times 69\tfrac{1}{6}' \\ &= \tfrac{445}{12^{\circ}} \times \tfrac{415}{6'} \\ &= \tfrac{184,675}{72} \\ &= 2496{\cdot}8 \text{ miles.} \end{aligned}$$

Time at Gibraltar—

$$\begin{aligned} &5\tfrac{1}{3} \times 4 \\ &= 21\tfrac{1}{3} \text{ minutes to 12.} \end{aligned}$$

(4) Into the Baltic Sea:
Neva, rising in Lake Ladoga; St. Petersburg.
Duna, rising in Valdai Hills; Riga.
Vistula, in the Carpathians; Cracow and Warsaw.
Oder, in the Carpathians; Stettin.
Tornea, in the Koelen Mountains.
Into the North Sea:
Elbe, rising in the Riesen Gebirge; Prague, Dresden, Berlin (Spree), Hamburg.
Rhine, in the Alps, Switzerland; Basel, Cologne, Coblenz.
Thames, in the Cotswold Hills; Oxford, Reading, London, Gravesend.
Tyne, in the Cheviots and Cross Fell; Newcastle and Shields.
Wear, in Kilhope Law; Sunderland and Durham.
Tees, in Cross Fell; Middlesborough, Stockton and Darlington.
Ouse, in Pennine Chain; York, Hull.
Forth, in Ben Lomond; Stirling, Edinburgh.
Tay, in Loch Tay; Perth, Dundee.

(5) The exports of India are: indigo, cotton, jute, rice, sugar, raw silk, pepper, teak, tea, oil, diamonds, muslins, shawls. India is politically divided into (1) Territories or provinces under the immediate government of Great Britain; (2) Independent States—Nepaul and Bhootan; (3) French and Portuguese possessions—Goa, Pondicherry, Daman, Diu, Carrical, and Mahe; (4) Feudatory or Native States, under native chiefs, but more or less subject to tribute and to British rule. Of these the principal are Indore, the Nizam's Dominions, Scindia's Dominions, Rajpootana, Rampore, Garwhal, Cashmere, Bhawalpore, Travancore and Cochin; Guicowar's Territory, Cutch, Kolapore, and other smaller States.
!! The Governor-General, aided by a Council at Calcutta, conducts the affairs of the country, under the direction of the Secretary of State for India, and a Council in London. The country is divided into districts, each having a Lieutenant Governor or Chief Commissioner.

END OF THIRD YEAR.

Euclid.

BOYS ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as —, +, ×.]

(*Answer two questions, including Question 3, if you can do so.*)

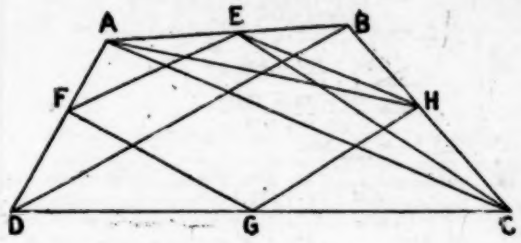
1. The straight lines which join the extremities of two equal and parallel straight lines towards the same parts, are also themselves equal and parallel.

Euclid, Book I., Prop. 33.

2. To describe a parallelogram equal to a given rectilineal figure, and having an angle equal to a given rectilineal angle.

Euclid, Book I., Prop. 45.

3. The figure formed by joining the middle points of the sides of a trapezium is a parallelogram equal to half the trapezium.



In △ BAC the opp. sides BA, BC are bisected. ∴ △ AEC = △ ECB (I. 38.) ∴ AEC = ½ ABC. Also AHC = ½ ABC. ∴ AEC = AHC and (I. 39) EH is parallel to AC. In like manner it may be shown that FG is parallel to AC. ∴ EH is parallel to FG. And FE, GH can be shown to be parallel to BD. ∴ HEFG is a parallelogram. Q.E.D.

Algebra.

BOYS ONLY.

(*Answer three questions only, including Question 4, if you can do so.*)

1. Simplify $\frac{1}{8}[x(x+1)(x+2)+x(x-1)(x-2)]+\frac{3}{4}(x-1)x(x+1)$.

2. Find the G.C.M. of $6x^5-4x^4-11x^3-3x^2-3x-1$; and $4x^4+2x^3-18x^2+3x-5$.

3. Simplify—

(1.) $\dfrac{a+b}{b}-\dfrac{2a}{a+b}+\dfrac{a^3-a^2b}{b^3-a^2b}$

(2.) $\dfrac{1}{x-1}-\dfrac{3+x}{2(x^2+1)}-\dfrac{1}{2(x+1)}$

4. Prove that in any equation any quantity may be transferred from one side to the other without affecting the result, the sign of the transferred quantity being changed.

Solve—

$$3x-4-\frac{4(7x-9)}{15}=\frac{1}{3}\left(6+\frac{x-1}{3}\right)$$

(1) $\frac{1}{8}[x(x+1)(x+2)+x(x-1)(x-2)]+\frac{3}{4}(x-1)x(x+1)$

$=\frac{1}{8}[x(x^2+3x+2)+x(x^2-3x+2)]+\frac{3}{4}x(x^2-1)$

$=\frac{1}{8}(2x^3+4x)+\left(\frac{2x^3-2x}{3}\right)$

$=\dfrac{2x^3+4x+4x^3-4x}{6}$

$=\dfrac{6x^3}{6}$

$=\underline{x^3}$. Ans.

(2)

$4x^4+2x^3-18x^2+3x-5)\ 6x^5-4x^4-11x^3-3x^2-3x-1\ (2$

$12x^5-8x^4-22x^3-6x^2-6x-2\ (3x$

$12x^5+6x^4-54x^3+9x^2-15x$

$-14x^4+32x^3-15x^2+9x-2$

-2

$28x^4-64x^3+30x^2-18x+4\ (7$

$28x^4+14x^3-126x^2+21x-35$

$-39)\ -78x^3+156x^2-39x+39$

$2x^3-4x^2+x-1$

$2x^3-4x^2+x-1)\ 4x^4+2x^3-18x^2+3x-5\ (2x+5$

$4x^4-8x^3+2x^2-2x$

$10x^3-20x^2+5x-5$

$10x^3-20x^2+5x-5$

(3)

(1) $\dfrac{a+b}{b} - \dfrac{2a}{a+b} + \dfrac{a^3 - a^2b}{b^3 - a^2b}$

$= \dfrac{a+b}{b} - \dfrac{2a}{a+b} - \dfrac{a^2(a-b)}{b(a^2-b^2)}$

$= \dfrac{a+b}{b} - \dfrac{2a}{a+b} - \dfrac{a^2}{b(a+b)}$

$= \dfrac{a^2 + 2ab + b^2 - 2ab - a^2}{b(a+b)}$

$= \dfrac{b^2}{b(a+b)}$

$= \underline{\dfrac{b}{a+b}}$. Ans.

(2) $\dfrac{1}{x-1} - \dfrac{3+x}{2(x^2+1)} - \dfrac{1}{2(x+1)}$

$= \dfrac{2(x+1) - (x-1)}{2(x^2-1)} - \dfrac{3+x}{2(x^2+1)}$

$= \dfrac{x+3}{2(x^2-1)} - \dfrac{3+x}{2(x^2+1)}$

$= \dfrac{(x^3 + 3x^2 + x + 3) - (x^3 + 3x^2 - x - 3)}{2(x^4-1)}$

$= \dfrac{2(x+3)}{2(x^4-1)}$

$= \underline{\dfrac{x+3}{x^4-1}}$. Ans.

(4) Let $x - c = y$ be any equation. Add c to each side.
Then $x - c + c = y + c$.
That is $x = y + c$.

Here therefore we have the same letters as in the given equation, but that the c has changed sides and changed signs.

$$3x - 4 - \frac{4(7x-9)}{15} = \frac{2}{5}\left(6 + \frac{x-1}{3}\right)$$

Mult. by 15.

$$45x - 60 - 28x + 36 = 72 + 4x - 4$$
$$45x - 28x - 4x = 72 - 4 - 36 + 60$$
$$13x = 92$$
$$\underline{x = \tfrac{92}{13} = 7\tfrac{1}{13}}. \text{ Ans.}$$

Mensuration.

BOYS ONLY.

(*Answer one question.*)

1. Compare the area of the triangle whose sides are 17, 105, 116, with the area of the right angled triangle whose sides are 28, 45, 53.

2. How many tiles $7\frac{1}{2}$ inches long and $4\frac{1}{8}$ inches broad will be required for a hall 32 ft. 6 in. long, 22 ft. 6 in. broad; and how much will they cost at $11\frac{1}{2}$d. the score?

(1) $\dfrac{116 + 105 + 17}{2} = \dfrac{238}{2} = 119$

$\sqrt{119\,[(119-116) \times (119-105) \times (119-17)]}$

$= \sqrt{119 \times 3 \times 14 \times 102}$

$= \sqrt{509{,}796}$

$= 714$. Area of 1st triangle.

Perpendicular $= 45$, base $= 28$.

$45 \times 14 = 630$. Area of right angled triangle.

$\underline{714 : 630}$. Ans.

(2) No. of tiles $= \dfrac{32 \text{ ft. } 6'' \times 22 \text{ ft. } 6''}{7\frac{1}{2}'' \times 4\frac{1}{8}''}$

$= \dfrac{390 \times 270 \times 2 \times 16}{15 \times 65}$

$= 3456$.

$\therefore$ Cost $= \dfrac{3456 \times 45}{20 \times 4}$

$= 1994$d.

$= \underline{£8\ 2\text{s.}}$ Ans.

Arithmetic.

GIRLS ONLY.

(*Answers three questions only, including the last, if you can.*)

1. A mowed ·7643 of a field; and B mowed ·157 of it. How much then remained to be mowed?

2. A man pays a quarterly income tax of £1 9s. 2d., the tax being 5d. in the £. What is his annual income?

3. If a metre measures 39·37 inches, how many metres are there in $49\frac{1}{10}$ miles?

4. Write out the rules for the conversion of circulating decimals to vulgar fractions, and give examples.

(1) $1 - (·7634 + ·157)$
$= 1 - ·9204$
$= \underline{·0796}$. Ans.

(2) Quarter's tax = £1 9s. 2d.
$\therefore$ Year's tax = £5 16s. 8d.
= 1,400d.
For every 5d. he has £1 of income,
$\therefore$ His income $= \dfrac{1400}{5} = \underline{£280}$. Ans.

(3) $49\frac{17}{80}$ miles = 49m. $\dfrac{17 \times 1760}{80}$ yds.

= 49m. 374 yds.

1760
3314
343
49
86614 yds.
3
259842 ft.
12
39·37)3118104·00(79200 metres
27559
36220
35433
7874
7874
·00.

4. If a pure circulator, write as many nines for the denominator as there are decimal places, and the decimal places for the numerator,

E.g., $·\dot{5} = \frac{5}{9}$, $·\dot{4}\dot{7} = \frac{47}{99}$, $·\dot{3}2\dot{5} = \frac{325}{999}$.

If a mixed circulator, for the numerator write down the fraction to the end of the first period, subtracting the figures which do not circulate, and for the denominator as many nines as there are figures circulating, followed by as many noughts as there are figures not circulating,

E.g., $·1\dot{5} = \dfrac{15-1}{90} = \frac{14}{90}$, $·03\dot{7}\dot{2} = \dfrac{372-3}{9900} = \frac{369}{9900}$.

Arithmetic.

BOYS ONLY.

(*Answer three questions only, including the last if you can.*)

1. Find the difference between the interest and the true discount on £132 5s. for 6 years at $2\frac{1}{2}$ per cent. per annum, simple interest.

2. Find the square root of 2196324 and of $1\frac{4}{9}$.

3. Subtract ·378 of 9½d. from ·378 of 1s. 4½d.

4. *Prove* that $\frac{1}{4}$ divided by 5 is $\frac{1}{20}$.
Divide $1\frac{3}{8} + 5\frac{1}{11} - 7\frac{3}{44}$ by $6^{\frac{1}{4}} + 3\frac{7}{12} - 9\frac{1}{3}$.

(1) Simple Int. £ £
£100 : $132\frac{1}{2}$ :: $2\frac{1}{2}$: x
Yrs. 1 : 6
$793\frac{1}{2}$
$2\frac{1}{2}$
1587
396 15s.
£1983 15s.
20
s. 16·75
12
d. 9·00

$x = \underline{£19\ 16\text{s. } 9\text{d.}}$ Int.

Discount.
£100 would produce $6 \times 2\frac{1}{2} = £15$.

$£115 : 132\frac{1}{2} :: 15 : x$

$= \frac{529 \times 15}{4 \times 115}$

$= \frac{63}{4}$

$= £17\ 5s.$ Discount.

Diff. $= £19\ 16s.\ 9d. - £17\ 5s. = £2\ 11s.\ 9d.$ Ans.

(2) $21\dot{0}6\dot{3}24$ (1482. Ans.

1 — $\sqrt{1\frac{482}{484}}$

24) 119
96

288) 2363 $= \sqrt{\frac{2}{484}}$.
2304

2962) 5924 $= \frac{1}{2}$.
5924 $= 1\frac{482}{484}$. Ans.

(3) $\cdot\dot{3}7\dot{8}$ of 1s. $4\frac{1}{2}$d. $- \cdot 378$ of $9\frac{1}{4}$d.

$= \left(\frac{378 - 3}{990} \times \frac{27}{4}\right) - \left(\frac{378}{1000} \times \frac{37}{4}\right)$

$= \left(\frac{375}{990} \times \frac{27}{4}\right) - \left(\frac{378}{1000} \times \frac{37}{4}\right)$

$= \frac{75}{88} - \frac{7}{8}$

$= \frac{13}{88}$

$= 2\frac{37}{88}$d. Ans.

(4) Our whole $= \frac{4}{4}$ or $\frac{84}{84}$

$\therefore \frac{1}{4} = \frac{21}{84}$

$\therefore \frac{1}{2} = \frac{42}{84}$

and $\frac{19}{84} \div 5 = \frac{19}{420}$

i.e. $\frac{1}{4} \div 5 = \frac{19}{420}$.

$1\frac{3}{4} + 5\frac{1}{12} - 7\frac{19}{420} + 6\frac{1}{7} + 3\frac{7}{12} - 9\frac{3}{4}$

$+ \frac{36 + 49 - 63}{84}$

$= 6\frac{63 + 136}{168} - 7\frac{19}{420} \div \frac{11}{84}$

$= 7\frac{331}{168} - 7\frac{19}{420} \div \frac{11}{84}$

$= \frac{331 - 7}{168} \div \frac{11}{84}$

$= \frac{324}{168} \div \frac{11}{84}$

$= \frac{6}{7} \times \frac{84}{11}$

$= \frac{72}{11}$. Ans.

END OF FOURTH YEAR.

Euclid.

BOYS ONLY.

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as −, +, ×.]

(*Answer two questions, including Question 3, if you can do so.*)

1. If a straight line be bisected and produced to any point, the rectangle contained by the whole line thus produced, and the part of it produced, together with the square on half the line bisected, is equal to the square on the straight line which is made up of the half and the part produced.

Euclid; Book II., Prop. 6.

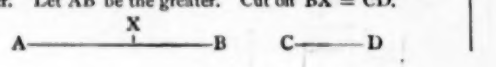
2. In a triangle in which the perpendicular from the vertex on the base falls without the triangle, the square on the side subtending an acute angle is less than the squares on the sides containing that angle, by twice the rectangle contained by either of these sides, and the straight line intercepted between the perpendicular let fall upon it from the opposite angle and the acute angle.

Euclid; Book II., Prop. 13, part 2.

3. Prove that the sum of the squares upon two lines cannot be less than twice their rectangle.

It is evident (II. 4) that the sq. on the sum of two lines together with twice their rect. = sq. on line made up of the two lines. But twice the rect. = twice the sq.; ∴ if the lines are =, the sum of the sqs. = twice the rect.

If the lines are unequal as AB, CD, then one is greater than the other. Let AB be the greater. Cut off BX = CD.



Then (II. 7) sq. on AB + sq. on BX = twice rect. AB, BX together with sq. on AX.

But BX = CD, ∴ sqs. on AB, CD = twice rect. AB, CD together with sq. on AX.

That is the sqs. on AB, BCD are greater than twice rect. AB, CD by the sq. on AX.

∴ the sqs. on AB, CD are always either equal to, or greater than, twice their rectangle. Q.E.D.

Algebra.

BOYS ONLY.

(*Answer three questions, including Question 4, if you can do so.*)

1. A mixture is made of a gallons at p shillings per gallon, b gallons at q shillings, and c gallons at r shillings. What will be its value per gallon?

2. Simplify—

(1) $\frac{3x^2 + 16x - 35}{5x^2 + 33x - 14}$

(2) $\frac{3a}{(a - 2b)^2} + \frac{2a + b}{(a + b)(a - 2b)} - \frac{5}{a + b}$

3. Solve the equations—

(1) $\frac{5x^2 + x - 3}{5x - 4} = \frac{7x^2 - 3x - 9}{7x - 10}$

(2) $\begin{cases} x = \frac{y - 3}{10} + \frac{5x - 2}{4} \\ y = \frac{x - 3}{6} + \frac{7y - 7}{4} \end{cases}$

4. Prove that the sum of the roots of the equation $x^2 - px + q = 0$ is p.
Solve—

$$x - 15\frac{3}{4} + \frac{5}{-15\frac{3}{4}} = 6.$$

(1) Cost $= \frac{a \times p + b \times q + c \times r}{a + b + c}$

$= \frac{ap + bq + cr}{a + b + c}$ Shillings. Ans.

(2) 1. $\frac{3x^2 + 16x - 35}{5x^2 + 33x - 14}$

$= \frac{(3x - 5)(x + 7)}{(5x - 2)(x + 7)}$

$= \frac{3x - 5}{5x - 2}$ Ans.

2. $\frac{3a}{(a - 2b)^2} + \frac{2a + b}{(a + b)(a - 2b)} - \frac{5}{a + b}$

$= \frac{3a^2 + 3ab + 2a^2 - 3ab - 2b^2 - 5a^2 + 20ab - 20b^2}{(a + b)(a - 2b)^2}$

$= \frac{20ab - 22b^2}{(a + b)(a - 2b)^2}$

$= \frac{2b(10a - 11b)}{(a + b)(a - 2b)^2}$ Ans.

(3) 1. $\frac{5x^2 + x - 3}{5x - 4} = \frac{7x^2 - 3x - 9}{7x - 10}$

$35x^3 - 43x^2 - 31x + 30 = 35x^3 - 43x^2 - 33x + 36$

$2x = 6$

$x = 3$. Ans.

2. $x = \frac{y - 3}{10} + \frac{5x - 2}{4}$

$y = \frac{x - 3}{6} + \frac{7y - 7}{4}$

$20x = 2y - 6 + 25x - 10$

$12y = 2x - 6 + 21y - 21.$

$-5x - 2y = -16$

$-2x - 9y = -27.$

$10x + 4y = 32$

$10x + 45y = 135$

$-41y = -103$

$y = 2\frac{41}{41}$. Ans.

$5x + 5\frac{1}{11} = 16$

$5x = 10\frac{10}{11}$

$x = 2\frac{8}{11}$. Ans.

(4) $x^2 - px + q = 0$

$x^2 - px = -q$

$x^2 - px + \left(\frac{p}{2}\right)^2 = -q + \frac{p^2}{4}$

$= \frac{p^2 - 4q}{4}$

$x - \frac{p}{2} = \pm \frac{\sqrt{p^2 - 4q}}{2}$

$x = \pm \frac{\sqrt{p^2 - 4q}}{2} + \frac{p}{2}$

The two roots added $= p$.

$x - 15\frac{3}{4} + \frac{5}{x - 15\frac{3}{4}} = 6$

$x^2 - \frac{63}{4}x + \frac{3969}{16} + 5 = 6x - 94\frac{1}{2}$

$x^2 - \frac{75}{4}x = -\frac{1512}{16} - \frac{80}{16} - \frac{3969}{16}$

$x^2 - \frac{75}{4}x + \left(\frac{75}{8}\right)^2 = -\frac{5561}{16} + \frac{5625}{64}$

$x - \frac{75}{8} = \sqrt{\frac{64}{16}} = \frac{8}{4} = \pm 2$

$x = \pm 2 + \frac{75}{8}$

$= \underline{39\frac{1}{2} \text{ or } 35\frac{1}{2}}$. Ans.

Mensuration.

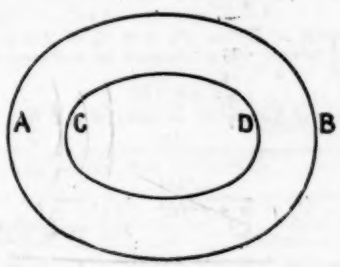
BOYS ONLY.

(Answer one question only.)

1. Find the cost of making a moat round a circular island at 1s. 3d. per square yard, the diameter of the island being 1,050 feet and the breadth of the moat 42 feet. $\left(\pi = \frac{22}{7}\right)$

2. The sides of a triangular field are respectively, 20 16, 24 chains. Find its acreage and the perpendicular distance of its longest side from the opposite corner.

(1)



		Yds.
AB = 1050 ft.	=	350
CD = 966 ft.	=	322
Their Sum	=	672
,, diff.	=	28

5376
1344
18816
15d.
282240
·7854
1128960
1411200
2257920
1975680
12)221671·2960 d.
2,0)1847,27·296
£923 12 7·296. Ans.

(2) $20 + 16 + 24 = 60$. $60 \div 2 = 30$

$30 \times 10 \times 14 \times 6 = 25{,}200$

$\sqrt{25{,}200} = 158{\cdot}74 +$ chains.

$= \underline{15{\cdot}874}$ acres. Ans.

$\frac{158{\cdot}74 \times 2}{24} = \underline{13{\cdot}22 +}$ chains. The perpendicular.

Arithmetic.

GIRLS ONLY.

(Answer three questions only, including the last, if you can.)

1. A man travelled $\frac{7}{10}$ of a journey by railway, $\frac{5}{16}$ by coach, and rode the last 27 miles on horseback. How long was his journey?

2. Two pipes, A and B, can fill a cistern in 4 minutes and 7 minutes respectively, and a third pipe, C, can empty it in 10 minutes. How long will it take to fill the cistern if all three pipes run together?

3. If £2,200 be laid out in the purchase of 3½ per cent. stock at 82½, what income will be obtained?

4. Distinguish between true and banker's discount; and find the difference between them on £500 due 8 months hence at 4½ per cent. per annum.

(1) $1 - \left(\frac{7}{10} + \frac{5}{16}\right)$

$= \frac{80 - (28 + 25)}{80}$

$= \frac{27}{80}$

miles miles

$\frac{27}{80} : 1 :: 27 : \underline{80}$. Ans.

(2) Filled Emptied

$\left(\frac{1}{4} + \frac{1}{7}\right) - \frac{1}{10}$ in one minute

$= \frac{70 + 40 - 28}{280}$

$= \frac{82}{280}$

min. mins.

$\therefore \frac{82}{280} : 1 :: 1 : \underline{3\frac{17}{41}}$. Ans.

£ £ £ £

(3) $82\frac{1}{2} : 2{,}200 :: 3\frac{1}{2} : x$

$\frac{165}{2} \times \frac{2200}{1} \times \frac{7}{2}$

$= \underline{£93\ 6s.\ 8d.}$ Ans.

(4) Banker's discount is the interest on the debt itself; true discount is the interest on the present worth of the debt.

£ £ £ £

Banker's discount $100 : 800 :: \frac{9}{12}$ of $4\frac{1}{2} : x$

$= \frac{9}{1} \times \frac{8}{2} \times \frac{8}{2}$

$= £24$

True discount, $\frac{3}{4}$ of $£4\frac{1}{2} = £3$.

£ £ £ £

$103 : 800 :: 3 : x$

$= \frac{24000}{103}$

$= £23\frac{31}{103}$

Diff. $= £24 - £23\frac{31}{103}$

$= £\frac{72}{103}$

$= \underline{13s.\ 11\frac{75}{103}d.}$ Ans.

Arithmetic.

BOYS ONLY.

(Answer three questions only, including the last, if you can.)

1. A man owns $\frac{3}{8}$ of a mine and sells ·2702 of his share; what fraction of the mine has he left?

2. A sum of money is to be divided amongst nine men and fourteen boys, and four men are to receive as much as seven boys. When two men and seven boys have received their shares, what fraction of the whole sum will remain?

3. What sum of money, put out to interest for four and a-half months at 4 per cent. per annum, will amount to £96 11s. 3d.?

4. Give a short sketch of a first lesson on decimals.
Find the square root of $153\frac{2}{25}$.

(1) $\frac{3}{8} - (·2702 \text{ of } \frac{3}{8})$

$= \frac{3}{8} - \left(\frac{2702}{9999} \times \frac{3}{8}\right)$

$= \frac{3}{8} - \frac{609}{9999}$

$= \frac{222 - 60}{999}$

$= \underline{\frac{111}{}}$. Ans.

m. m. boys boys

2. A man's share = 4 : 1 :: 7 : $1\frac{3}{4}$

Total No. of parts = $(9 \times 1\frac{3}{4}) + 14$

$= 15\frac{3}{4} + 14$

$= 29\frac{3}{4}$

Two men receive $2 \times 1\frac{3}{4} = 3\frac{1}{2}$

Seven boys ,, 7

Total parts given = $10\frac{1}{2}$

,, left = $29\frac{3}{4} - 10\frac{1}{2} = 19\frac{1}{4}$

∴ The fraction left = $\frac{19\frac{1}{4}}{29\frac{3}{4}} = \frac{77}{119}$. Ans.

(3) £100 put out would make $\frac{4\frac{1}{2}}{12}$ of 4 = £1½ and would amount to £101½.

£ £ £

∴ $101\frac{1}{2} : 96\frac{9}{16} :: 100 : x$

$x = \frac{9}{203} \times \frac{385}{16} \times \frac{200}{1}$

$= \frac{385}{8}$

= £95 2s. $8\frac{4}{8}$d. Ans.

(4) Begin by reference to ordinary notation and show that each similar figure in a number of two or more digits is 10 times the value of the same figure on its right: thus 11 stands for 10 and 1, the left-hand 1 being 10 times the value of the other 1. Similarly show that the right-hand figure is one-tenth of the one on its left.

Next write down 1 and place a dot or point after it, and explain that the dot is to show where the whole numbers end. If the 1 is a unit, then a 1 placed after the dot thus, 1·1 will be a tenth of a unit; a second 1 thus, 1·11, one hundredth part of a unit. It is thus possible to write down any fraction whose denominator is 10, or a power of 10, without writing down the numerator. Such fractions, because they have 10's for their denominator, are called decimal fractions.

Next give a large number of decimals on the black-board and ask for the reading of them, thus—·3, ·9, ·7, ·07, ·04, ·004, ·025, &c.

Then follow with a number of decimals to be dictated and written on slates.

$\sqrt{153\frac{1}{16}} = \sqrt{\frac{2449}{16}} = \frac{49}{4} = 12\frac{1}{4}$.

(To be continued.)

My Scholarship Answers.

BY GEORGE R. BARNARD,

DETMOLD ROAD BOARD SCHOOL, UPPER CLAPTON, LONDON.

(First on the Scholarship List, 1889.)

MALE CANDIDATES.

Arithmetic.

(Three hours allowed for this paper.)

Candidates may not answer more than three of the sections under question 1, and may answer 11 other questions.

1. (*a*) Prove that seven times nine = nine times seven.

7 times 9 = 9 + 9 + 9 + 9 + 9 + 9 + 9 = 63

9 times 7 = 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 = 63

Q.E.D.

(*c*) Prove as to children who are beginning addition of fractions that $2\frac{4}{15} + 3\frac{2}{3} = 5\frac{14}{15}$.

1st. 2 + 3 = 5

2nd. $\frac{4}{15} = \frac{12}{45}$ (show this by diagram.)

3rd. $\frac{2}{3} = \frac{30}{45}$ (show this by diagram.)

4th. ∴ $\frac{4}{15} + \frac{2}{3} = \frac{12}{45} + \frac{30}{45} = \frac{42}{45}$.

∴ $2\frac{4}{15} + 3\frac{2}{3} = 5\frac{14}{15}$. Q.E.D.

(*d*) Define factor, prime number, average, true discount, with examples. Which is greater, the discount on a sum due in a certain time, or the simple interest on the sum for that time, the rate °/₀ being the same?

A *factor* of a given number is a number which is contained an exact number of times in that given number, thus 8 is a factor of 24, &c.

A *prime number* is one which is divisible only by itself and unity.

An *average* of given numbers is the mean proportional of those numbers, *i.e.*, that term which when multiplied by the number of terms will equal the sum of all the terms, *e.g.*, the average of 4, 19, 28, 107, 7, is 33.

True Discount is that deduction from the amount of a bill which leaves a principal just sufficient to amount to the original bill at the given rate and in given time. For example, the True Discount on £200 for 2 years at 5°/₀ would be $£18\frac{18}{119}$, because the remainder, $£181\frac{101}{119}$, would in 2 years at 5°/₀ just amount to £200.

The *Simple Interest* on £200 for 2 years at 5°/₀ is £20. ∴ other things being equal, Simple Interest is greater than True Discount.

2. A truck is loaded with 50 sacks; the sack itself in each case weighs 5 lbs. 11 oz., and each sack contains 90 lbs of grain. Find the weight of the whole load in tons, cwts., &c.

Weight of each full sack 95 lbs. 11 oz.

50

2 tons 2 cwt. 80 lbs. 6 oz. Ans.

4. A man runs $2\frac{4}{7}$ times round a course of $293\frac{1}{2}$ yds. What fraction of 1 mile 935 yds. does he run?

$$\frac{2\frac{4}{7} \text{ of } 293\frac{1}{2} \text{ yds.}}{1 \text{ mile } 935 \text{ yds.}} = \frac{\overset{2}{\cancel{18}} \quad \overset{1}{\cancel{14}}}{\underset{1}{\cancel{880}} \times \underset{1}{\cancel{21}}} \Big/ \frac{3 \times 8 \times 2695}{1 \quad 1 \quad 385}$$

$= \frac{2}{7}$. Ans.

6. Take ·0625 of £28 6s. 0d. from $\frac{17}{18}$ of £20 0s. 6d. and find by what decimal the result must be multiplied to produce £2 17s. $1\frac{3}{4}$d.

£2 17s. $1\frac{3}{4}$d.

$\frac{17}{18}$ of £20 0s. 6d. − ·0625 of £28 6s.

$= \frac{2743}{960} \Big/ \frac{17}{18} \text{ of } \frac{201}{40} - \frac{1}{16} \text{ of } \frac{343}{10}$

$= \frac{2743}{960} \Big/ \frac{2743}{160}$

$= \frac{1}{6} = \cdot\dot{1}6$. Ans.

7. In a book on Arithmetic an example was printed thus, 'If 11 acres, — roods, 8 poles of ground be worth £2,250, what will 44 acres, 3 roods, 1 pole cost?'—the number of roods in one case being accidentally omitted. The answer given at the end of the book was £8,718 15s. Required the missing number.

£8,718¾ : £2,250 :: 7,161 poles : x

$$\frac{\overset{2}{\cancel{4}} \times \overset{231}{\cancel{2250}} \times 7161}{\underset{1}{\cancel{34875}}} = 1{,}848 \text{ pls.}$$

1,848 poles = 11 acres 2 roods 8 poles.

∴ missing number was 2 roods. Ans.

8. A warehouse consists of 5 floors; the rent of each floor is ·9 that of the floor below. Find the ratio of the rents of the highest and lowest floor and find also the rent of the lowest floor. Rent of middle floor is £33 15s.

Floor number 5 = ·6561

,, 4 = ·729

,, 3 = ·81

,, 2 = ·9

,, 1 = 1·0

∴ ratio of rents of top and bottom = ·6561 : 1. Ans.

81 : 100 :: $33\frac{3}{4}$ £ : x

$$\frac{\overset{15}{\cancel{100}} \times \overset{135}{\cancel{135}}}{\underset{9}{\cancel{81}} \times \underset{1}{\cancel{4}}} = 41\frac{1}{4}\text{ £}$$

= £41 13s. 4d. Ans.

9. The total area of 3 estates is 3,536 acres. If the area of the two smaller estates be respectively $\frac{3}{4}$ and $\frac{2}{3}$ that of the largest, find the acreage of each.

Comparative area = 1, $\frac{3}{4}$, $\frac{2}{3}$.
= 15, 10, 9. Total 34.

34 parts = 3,536 acres, ∴ 1 part = 104 acres.

∴ area = 1. 1,560 acres
2. 1,040 acres
3. 936 acres
} Ans.

10. Subtract the number whose square root is ·01 from the number whose square is ·01871424.

·01 ·0001 ·01871424(·1368
1
23 | ·87
69
266 | 1814
1596
2728 | 21824
21824

·1368 − ·0001 = ·1367. Ans.

11. At an examination in which full marks were 1,000, A got 20 per cent. more than B, B 10 per cent. more than C, C 20 per cent. less than D. If A got 660, what percentage of full marks was obtained by D?

A to B. B to C C to D.
120 : 100 110 : 100 80 : 100
= 660 : 550 = 550 : 500 = 500 : 625

∴ D got 62·5 per cent. Ans.

12. At what rate per cent. per annum simple interest will £1,350 amount to £1,621 13s. 9d. in $5\frac{3}{4}$ years?

Amount £1,621 13 9
Principal £1,350 0 0
Interest £271 13 9

{£1,350 : £100 :: £271$\frac{13}{20}$: x.
{yrs. $5\frac{3}{4}$: yr. 1

$$\frac{\overset{1}{\cancel{4}} \times \overset{1}{\cancel{100}} \times \overset{7}{\cancel{4347}}}{\underset{1}{\cancel{23}} \times \underset{1}{\cancel{1350}} \times \underset{2}{\cancel{16}}} = \frac{7}{8}$$

= 3½ per cent. Ans.

13. Find the exact difference between the compound and simple interest on £2,450 for 3 yrs. at 3 per cent. per annum.

£100 : £2,450 :: £9 : £220 10s. = simple interest.

Compound. The interest each yr. = $\frac{309}{4000}$ of Principal.

1st yr. Principal £2,450 ∴ Interest = £73·5
73·5
2nd yr. Principal £2,523·5 ∴ Interest = £75·705
75·705
3rd yr. Principal £2,599·205 ∴ Interest = £77·97615
Total Interest £227·18115

£227·18115 − £220·5 = £6·68115
= £6 13s. 7·476d. Ans.

14. What is the price of Three per Cent. Stock when a sum of £4,353 4s. 7d. when invested will produce an income of £132 5s.?

£132¼ : £3 :: £4,353$\frac{23}{240}$: x

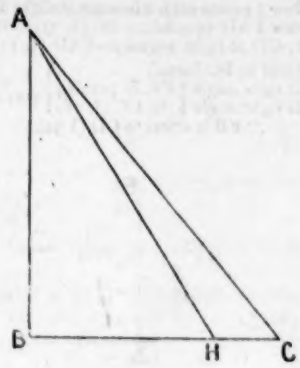
$$\frac{\overset{395}{\cancel{4}} \times \overset{1044775}{\cancel{4353}} \times \overset{1}{\cancel{3}}}{\underset{4}{\cancel{249}} \times \underset{1}{\cancel{529}}} = 98\tfrac{3}{4}$$

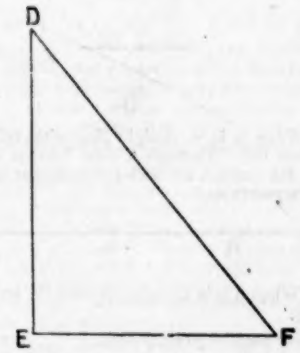
Price of Stock 98¾. Ans.

Euclid.

(Three hours allowed for this paper, Algebra, Euclid and Mensuration.)

1. If two triangles have two angles of the one equal to two angles of the other, each to each, and one side equal to one side, these sides being opposite to equal angles in each, then shall the other sides be equal each to each, and also the third angle of the one equal to the third angle of the other.





Let ABC, DEF be two triangles having AB = to DE, and having angles ABC, BCA = DEF, EFD each to each.

Then shall the other sides be equal, viz., AC to DF and BC to EF, and the angle BAC shall equal EDF.

Proof—

For if BC be not equal to EF,

One of them must be greater than the other.

Let BC be the greater, and make BH = to EF (I. 3).

Join AH.

Now BH = EF (cons.)
AB = DE (hyp.)
ang. ABH = DEF (hyp.)
} ∴ triangles ABH and DEF are equal in every respect (I. 4).

∴ angle BHA = angle EFD.
But EFD = ang. BCA (hyp.),
∴ ang. BHA = ang. BCA (Ax. 1).

i.e., exterior ang. is equal to interior and opposite ang. which is impossible. (I. 16.)

∴ BC is not unequal to EF.

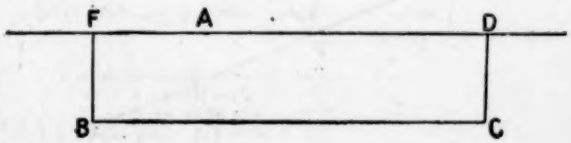
∴ it is equal to it
and AB = DE (hyp.)
ang. ABC = DEF (hyp.)
} ∴ triangles are equal in every respect (I. 4).

∴ base AC = base DF,

∴ angle BAC = ang. EDF.

Wherefore, if two triangles, &c. Q.E.D.

1. (*b*) A, B, C are three given points. Through A draw a line such that perpendiculars upon it from BC may be equal.

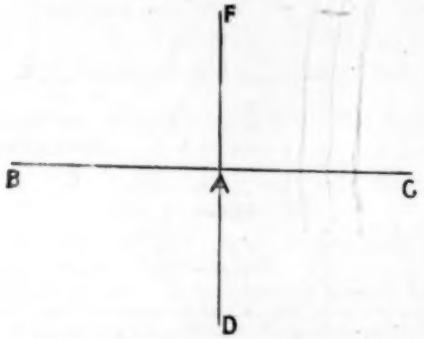


Case I. (when 3 points are not in same straight line). Join BC. Through A draw FAD parallel to BC (I. 31). From B and C draw lines BF, CD at right angles to FAD (I. 12).

FAD is parallel to BC (cons.)
ang. BFD is right angle } FB is parallel
ang. CDF is right angle } to DC (I. 28) } ∴ FDCB is a parallelogram.

∴ FB is equal to CD (I 34).

Q.E.F.



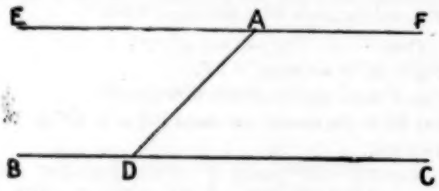
Case II. (When A is in straight line with BC and midway between). Join BC. Through A draw FAD at right angles to BC (I. 11). BA and CA are each perpendicular to FAD (cons.), and they are equal (hyp.). Q.E.F.

Case III. (When A is in straight line with BC and not midway). Failing case.

2. (*a*) Define parallel straight lines.

Parallel straight lines are such as are in the same plane, and which being produced ever so far both ways do not meet.

(*b*) To draw a straight line through a given point parallel to a given straight line.



Let A be given point and BC the given straight line.

In BC take any point D.

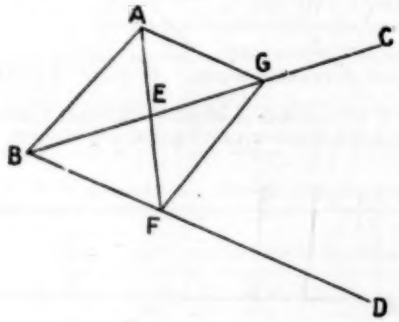
At the point A in straight line AD make angle DAE equal to the alternate angle ADC (I. 23).

Produce EA to F.

Angle DAE is equal to alternate angle ADC (cons.).

∴ EF is parallel to BC. Q.E.F.

(*c*) A is a point without the angle CBD. Draw from A a straight line AEF, cutting BC in E, BD in F, so that AE may be equal to EF.



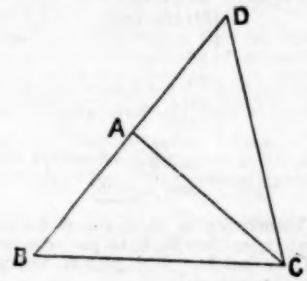
Construction—Join AB. Through A draw AG parallel to BD, cutting BC in G (I. 31). Through G draw GF parallel to BC, cutting BD in F (I. 31). Join AF, cutting BC in E. AEF is line required.

Proof—ABFG is a paralellogram (cons.);

∴ AB = GF (I. 34)
ang. BAF = AFG (I. 29) } ∴ AE = EF (I. 26).
ang. ABG = BGF (I. 29)

Q.E.F.

3. (*a*) If square described on one of the sides of a triangle be equal to squares described on the other two sides of it, the angle contained by these two sides is a right angle.



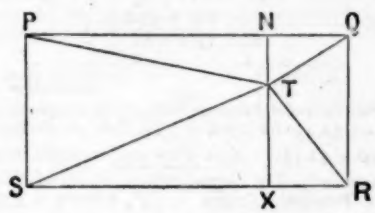
Given square on BC = to squares on BA, AC. Prove BAC is a right angle. From A draw AD at right angles to AC (I. 11). Make AD = to BA (I. 3). Join DC. DA = BA. ∴ sq. on DA = sq. on BA. To each add sq. on AC. ∴ squares on DA, AC = squares on BA, AC (Ax. 2); but DAC is a right angle (cons.). ∴ square on DC = squares on DA, AC (I. 47).

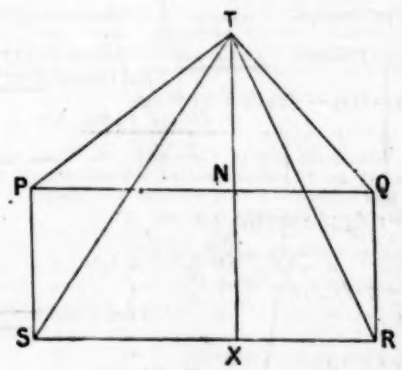
∴ square on DC = square on BC (Ax 1).

∴ DC = BC
DA = AB (cons.) } ∴ ang. DAC = BAC (I. 8).
AC is common

But DAC is right angle; ∴ BAC is right angle (Ax. 1).

Q.E.D.





(*b*) PQRS is a rectangle, T any point. Show by Book I., Prop. 47, that the squares on TP, TR are together equal to squares on TQ, TS.

Construction (both cases proved in similar manner; the same letters answer for both cases).

Draw TN perpendicular to PQ (I., 12).
,, TX ,, SR (,,).

Proof—

{Squares on TN, PN together = square on PT (I. 47).
 ,, TX, RX ,, = ,, TR (,,).}

{Squares on TX, SX together = square on TS (I. 47).
 ,, TN, QN ,, = ,, TQ (,,).}

By addition—

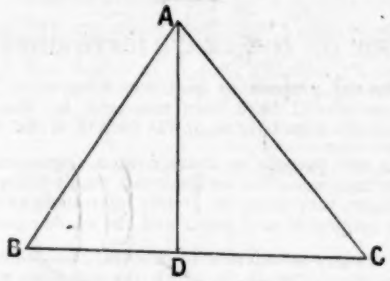
Squares on TN, PN, TX, RX = squares on PT, TR (Ax. 2).
,, TX, SX, TN, QN = ,, TS, TQ (Ax. 2).

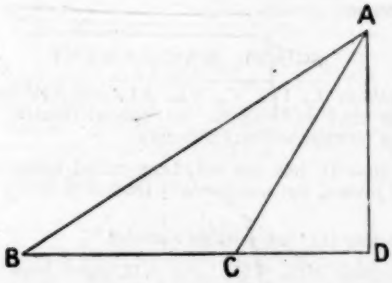
Now in two above lines TN, TX occur in each,
And PN = SX (I. 34).
,, QN = RX (,,).
∴ Both lines are equal.
∴ Squares on PT, TR = squares on TS, TQ (Ax. 1).
Q.E.D.

4. (*a*) What is the objection to the use of algebraical processes in demonstrating the propositions of the Second Book.

The objection referred to is chiefly this: Algebra treats of quantities in the abstract, whilst the propositions of the Second Book treat of superficial area.

(*b*) In every triangle the square on the side subtending an acute angle is less than the squares on the sides containing that angle by twice the rectangle contained by either of these sides, and the straight line intercepted between the perpendicular let fall on it from the opposite angle, and the acute angle.





ABC is any triangle, B is an acute angle. From A draw AD perpendicular to BC or BC produced. (N.B.—First two cases can be proved in precisely the same way, instead of, as Euclid does, making two separate proofs.)

Proof (Cases I. and II.)—

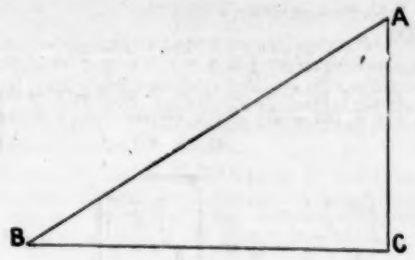
Squares on BC and BD together = twice rectangle CBBD and square on CD (II., 7).

To each add square on DA.

∴ Squares on BC, BD, DA = twice rectangle CBBD and squares on CD, DA (Ax. 2).

But square on AB = squares on BD, DA (I. 47).
And ,, AC = ,, CD, DA (,,).

∴ Squares on CB, BA = square on AC, and twice rectangle CBBD, *i.e.*, square on AC is < squares on CBBA by twice rectangle CBBD. Q.E.D.



Case III.—It is manifest that squares on AB, BC are = square on AC, and twice square on BC (I., 47 and Ax. 2).
Q.E.D.

Algebra.

5 (*a*) Divide $2x^4 + 12x^3 + 26x^2 + 24x + 8$ by $x^2 + 3x + 2$

$$
\begin{array}{r}
x^2 + 3x + 2 \overline{)2x^4 + 12x^3 + 26x^2 + 24x + 8} (2x^2 + 6x + 4 \\
2x^4 + 6x^3 + 4x^2 \\
\hline
6x^3 + 22x^2 + 24x \\
6x^3 + 18x^2 + 12x \\
\hline
4x^2 + 12x + 8 \\
4x^2 + 12x + 8 \\
\hline
\end{array}
$$

$2x^2 + 6x + 4$. Ans.

(*b*) Factorize

$21x^2 - 40x - 21 = (7x + 3)(3x - 7)$
$143x^2 + 8x - 16 = (13x - 4)(11x + 4)$
$x^3 - 2x^2 + 2x - 1 = (x - 1)(x^2 - x + 1)$

6. (*a*) Prove that if c be a common measure of a and b, it will also measure $ma \pm nb$.

Let $a = cx$ ∴ $ma = mcx$
Let $b = cy$ ∴ $nb = ncy$
∴ $ma \pm nb = mcx \pm ncy$
$= c(mx \pm ny)$
∴ c is a measure of $ma \pm nb$.

(*b*) Find the G.C.M. of $6x^3 - 10x^2 + 10x - 4$ and $9x^3 + 3x^2 + 3x - 6$.

$6x^3 - 10x^2 + 10x - 4 = 2(x^2 - x + 1)(3x - 2)$
$9x^3 + 3x^2 + 3x - 6 = 3(x^2 + x + 1)(3x - 2)$
G.C.M. = $3x - 2$. Ans.

7 (*a*) Prove rule for dividing one fraction by another.

Prove $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$

Let $\frac{a}{b} = x$, and $\frac{c}{d} = y$

∴ $a = bx$, and $c = dy$
∴ $ad = bdx$, and $bc = bdy$
∴ $\frac{ad}{bc} = \frac{bdx}{bdy} = \frac{x}{y}$

But $\frac{x}{y} = x \div y = \frac{a}{b} \div \frac{c}{d}$

∴ $\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc} = \frac{a}{b} \times \frac{d}{c}$.

Q.E.D.

(*b*) Simplify

$$
\begin{aligned}
&\frac{x^3 + 2}{(x-2)^2(x^2+1)} - \frac{4}{5(x-2)} - \frac{x+2}{5(x^2+1)} \\
&= \frac{5(x^3+2) - [4(x-2)(x^3+1) + (x+2)(x-2)^2]}{5(x-2)^2(x^2+1)} \\
&= \frac{5(x^3+2) - (x-2)(4x^2+4+x^2-4)}{5(x-2)^2(x^2+1)} \\
&= \frac{5x^3 + 10 - 5x^3 + 10x^2}{5(x-2)^2(x^2+1)} \\
&= \frac{10(x^2+1)}{5(x-2)^2(x^2+1)} \\
&= \frac{2}{(x-2)^2} \text{ Ans.}
\end{aligned}
$$

8. Solve the equations :—

(*a*)

$$\frac{x+10}{5} - \left(4\tfrac{3}{4} + \frac{x}{4}\right) = \frac{x-2}{3} - (x-1)$$

$$= 12(x+10) - 15(19+x) = 20(x-2) - 60(x-1)$$

$$= 12x + 120 - 285 - 15x = 20x - 40 - 60x + 60$$

$$37x = 185$$

$$\therefore \underline{x = 5.}$$

(*b*)

$$\left\{\begin{array}{l} \dfrac{3x+1}{7} - \dfrac{2x-y}{2} = \dfrac{2y-x}{8} \\ \dfrac{4x-2}{3} - \dfrac{4y-5x}{2} = \dfrac{x+y}{5} \end{array}\right\}$$

Clear of fractions.

$$\left\{\begin{array}{l} 8(3x+1) - 28(2x-y) = 7(2y-x) \\ 10(4x-2) - 15(4y-5x) = 6(x+y) \end{array}\right\}$$

Multiply out.

$$\left\{\begin{array}{l} 24x + 8 - 56x + 28y = 14y - 7x \\ 40x - 20 - 60y + 75x = 6x + 6y \end{array}\right\}$$

Collect terms.

$$\left\{\begin{array}{l} 14y - 25x = -8 \\ 109x - 66y = 20 \end{array}\right\}$$

Multiply top line by 33, bottom line by 7.

$$\left\{\begin{array}{l} -825x + 462y = -264 \\ 763x - 462y = 140 \end{array}\right\}$$

Add $-62x = -124$

$$\therefore x = 2$$

by substituting $y = 3$ $\qquad$ $\underline{x = 2}$ $\qquad$ $\underline{y = 3.}$

(*c*)

$$\frac{1}{9-2x} + \frac{1}{3} = \frac{1}{3-x}$$

Clear of fractions

$$5(9-2x) = (3-x)[5 + 4(9-2x)]$$

$$45 - 10x = (3-x)(5 + 36 - 8x)$$

$$45 - 10x = (3-x)(41 - 8x)$$

$$45 - 10x = 123 + 8x^2 - 65x$$

$$\therefore 8x^2 - 55x + 78 = 0$$

$$\therefore (8x - 39)(x - 2) = 0$$

$$\therefore x = \underline{2 \text{ or } 4\tfrac{7}{8}}.$$

9. In a factory there are 62 workmen and the total amount of their weekly wages is £74 6s. A certain number of them receive 40/- a week, twice as many receive 29/6 a week and the rest 17/- a week. Find the number receiving each rate of wages.

Let x = number of men receiving 40/- per week, then $2x$ receive 29/6 per week and $62 - 3x$ receive 17/- per week.

Thus we form following equation

$$40x + 59x + (1054 - 51x) = 1486$$

Whence $48x = 432$

$$\therefore x = 9$$

Number receiving 40/- = 9
" 29/6 = 18
" 17/- = 35

Mensuration.

10. Show that the area of a triangle whose sides are 26, 35, and 51 is the same as the area of a right angled triangle whose sides about the right angle are 7 and 120.

Area of 1st triangle

$= \sqrt{s(s-a)(s-b)(s-c)}$. $\qquad$ s = semiperimeter, a, b, c = sides.

$= \sqrt{(56 \times 30 \times 21 \times 5)}$.

$= \sqrt{(7 \times 2 \times 2 \times 5 \times 3 \times 2 \times 7 \times 3 \times 5)}$.

$= 7 \times 2 \times 2 \times 5 \times 3 = 420$

Area of second triangle

$\dfrac{7 \times 120}{2} = 420$

Q.E.D.

11. The circumference of a circular field is 252 yards ; if the field be worth £48 16s. find the value of a similar circular field whose circumference is 315 yards.

Circumference of the two fields

	252 yards		315 yards.
This is as	4	:	5.
∴ Areas will be as	16	:	25.

16 : 25 :: £48 16s.

$$\frac{25 \times 244}{16 \times 5} = £\frac{305}{4}$$

$= \underline{£76\ 5s.}$ Ans.

Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Head Master of Christ Church Schools, Macclesfield, Co-author of 'Our Mother Tongue, &c.'

REVIEW OF THE CERTIFICATE QUESTIONS.

WE do not propose to give any hints as to how the questions should have been answered, for this will be exhaustively done later on, in the form of Model Answers.

It is our purpose to indulge in a few running and gossipy comments (for we know our pupils will enjoy the monologue, they being so greatly interested), and to sum up our opinion of each paper and the whole examination.

Our readers are advised to procure *The Schoolmaster*, for Saturday, 21st ult., in which the questions were published, as our space forbids their present appearance, and as the Model Answers before referred to will appear in due course.

SCHOOL MANAGEMENT.

Questions I., IV., V., VI., XI., and XIV. are of the routine kind and call for no special remark, as they present no extraordinary difficulty.

Question II. has not only been called attention to by us in 'Jevons,' but was partially treated of in the October issue.

Question III. is a suitable exercise.

Questions VII., VIII. and XII. have been specially called attention to by Mr. Cowham.

Questions VII., IX. and XIII. were ACTUALLY SET in our NOVEMBER test paper.

Question X. was set in May's Routine and fully discussed in May, 1888.

SUMMING-UP.—*This Paper is an exceedingly fair one*, eight questions only having to be answered out of fourteen, the three questions on *Locke* having been treated of by Mr. Cowham, no question being beyond the Syllabus, and FIVE HAVING BEEN ACTUALLY 'SPOTTED' by us.

ENGLISH.

(Males).—A very erratic paper, only ONE question (No. V.) being asked about '*Bacon*,' and that one could be half answered without even knowing that his essays existed.

The Department is laying a trap, and will within the next few years overwhelm the unwary student, whom it will have enticed to neglect this author.

The Composition question and queries II. and III. are ordinary ones, the answers to the two latter being given in Mr. Kinton's articles.

Question I. Two out of the three excerpts for paraphrasing, viz., the second and third, have not only been given in our Routines, but paraphrased by us as Models, and the third passage was set in our Test Paper for Females given in last month's issue.

Question VI. was actually asked in December's Test Paper, as was also part of Question IV.

SUMMING-UP.—A decidedly easy paper, well within the Syllabus, but rather catchy.

Out of the seven questions, three were general ones, and THREE HAD ACTUALLY BEEN SPOTTED BY US.

ALGEBRA.

This paper is, as always, a difficult one, but little more so than usual.

Questions I., III., IV., VI. and VIII. are of the usual character, somewhat miscellaneous, but familiar to the user of ordinary text books.

Question II. was actually set in our August number. A question similar to V. was given in the June issue. *Question* VII. was explained in July, *Question* IX. in May, *Question* X. was given in our paper of Sept., 1888, and *Question* XI. in June, 1889.

SUMMING-UP.—A slightly-above-the-average test; five questions could be answered almost directly from ordinary Algebras, and SIX QUESTIONS HAVE ACTUALLY BEEN SPOTTED BY US.

MENSURATION.

A very difficult paper for an examination of this kind and one that would sorely puzzle the average student. Last year's test was much easier. We have not in our articles given much space to Mensuration, as not 5 per cent. of acting teachers take the subject.

ARITHMETIC.

Questions similar to I. and III. were set in our September number. *Question* II. is an easy cube root, and *Question* IV. was of an ordinary kind.

A decidedly easy paper.

EUCLID.

This paper is much as usual, except that a 12th question, generally a difficult deduction, is, like last year, not given. Prop. VI. 2 has now been given five times in recent years; the other Propositions required are *not* the favourite ones generally asked for.

The number of questions given upon each book is with one exception the same as stated in our Article for Sept., 1888.

Three of the very propositions were asked for in our Test Paper of October last, viz., Euclid II. 11, III. 20, and VI. 2.

The deductions have mostly been set in our routines and are well-known ones.

SUMMING-UP.—An average paper well within the reach of moderate industry and ability.

Out of eight required questions, THREE OF THE PROPOSITIONS HAD BEEN PREVIOUSLY INDICATED IN ONE TEST PAPER BY US.

GEOGRAPHY.

(Males).—All the questions were well within the Syllabus, except the two last, which, strictly speaking, although they are good ones, should not have been asked, as they require a good general knowledge, and are somewhat too historical and philosophical. Eight and a-half questions could have been answered from our Routines.

SUMMING-UP.—With the exception of Questions IX. and X., one of which was practically compulsory, the paper was not of more than ordinary difficulty, but reckoning it as a whole it was harder than usual.

HISTORY.

(Males).—This paper is a fairly difficult one, but as only eight questions were to be answered out of (practically) thirteen, it is somewhat thereby redeemed.

Question XII. is distinctly beyond the Syllabus.

There are none of the remaining eleven questions which our Routines have not indicated, and QUESTIONS X., XI., IV. AND PART OF V. WERE ASKED more or less distinctly IN OUR NOVEMBER TEST.

MUSIC.

As usual this is the easiest paper. Were it not that this test is always in a stereotyped form, the coincidence of our December with the Department questions would be simply marvellous.

In the Staff Notation our Test Questions of December, Nos. I., II., III., V., VII., VIII., X., XI., AND IN TONIC SOL-FA, NOS. I., II., III., IV., V., VI., VII., VIII., X., XI., HAD THEIR ALMOST EXACT COUNTERPARTS IN THE OFFICIAL TESTS.

As only nine questions could be answered our pupils ought easily to obtain the *maximum* number of marks.

GRAND SUMMARY.

On the whole the Examination was NOT more stringent than usual, although slightly inclining to be so. The English did not give fair play to the industrious student of Bacon, and the Mensuration is greatly more advanced than usual.

With the exception of the questions beyond the Syllabus *all of the queries have been covered by our Articles;* MORE THAN THIRTY QUESTIONS ARE ALMOST IDENTICAL WITH OUR TEST ONES, AND MANY OTHERS ARE VERY SIMILAR.

CORRESPONDENCE.

Any letters may be addressed either to 'THE CERTIFICATE EDITOR,' *at Pilgrim Street, Ludgate Hill, or to Christ Church Schools, Macclesfield.*

Communications requiring epistolary replies will, if containing stamped and addressed envelope, receive prompt attention.

ANSWERS TO CORRESPONDENTS.

H. L. (Bedford), M. P. (Aberdare), CROWN (Douglas).—We cannot possibly judge from the facts forwarded.

S. W. R. (Scarborough).—It is too late now.—FANNY (Croydon). Begin at once.

E. J. G. (Bangor), B. J. (Thetford), E. W. (Leeds), two letters; G. W. (Elswick), W. S. (Oxford), H. H. (Lanark), answered per ordinary letter.

WE SHALL BE VERY GLAD TO HEAR FROM OUR READERS THE RESULTS OF THEIR CERTIFICATE EXAMINATION.

Query Column.

RULES.

1. **Each correspondent is restricted to *one question*.** We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

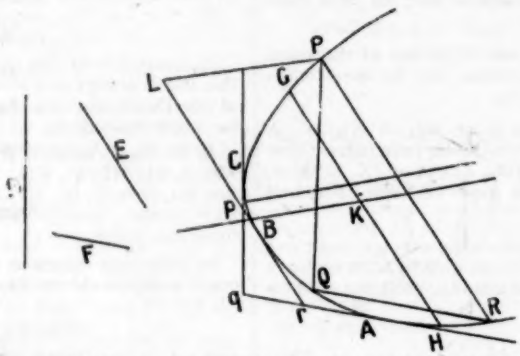
6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher*, *Pilgrim Street, Ludgate Hill, London, E.C.*

General.

1. G. W.—Find three points P, Q, R on a given parabola, such that the triangle PQR may have its sides parallel to three given straight lines. P is any point on the common tangent of two given parabolas which have the same focus; if SM, SN be the perpendiculars let fall on the two other tangents drawn from P, show that SM and SN are in a constant ratio.

(*Science and Art.*)



(*a*) Let D, E, F be the three given straight lines, and let PQR be the given parabola. Draw any straight line GH parallel to E. Bisect GH in K, and draw KB parallel to the axis of the parabola.

Through B draw *p* B *r* parallel to GH or E.

Then *pr* is a tangent at B.

Similarly find the points A and C, and draw lines *qr* A and C *pq* parallel to F and D respectively.

Then *pqr* is a triangle similar and similarly situated to the triangle required.

If PQR is the triangle required, the diameter through A is half-way between the diameters through Q and R, and the diameter through B is half-way between the diameters through P and R.

Hence the distance between the diameters through A and B is half the distance between the diameters through Q and P.

Again, the diameter through *q* is half-way between the diameters through A and C, and the diameter through *p* is half-way between the diameters through B and C. Hence the distance between the diameters through *q* and *p* is half that between A and B, and therefore one-fourth of the distance between Q and P; hence *qp* is one-fourth of QP.

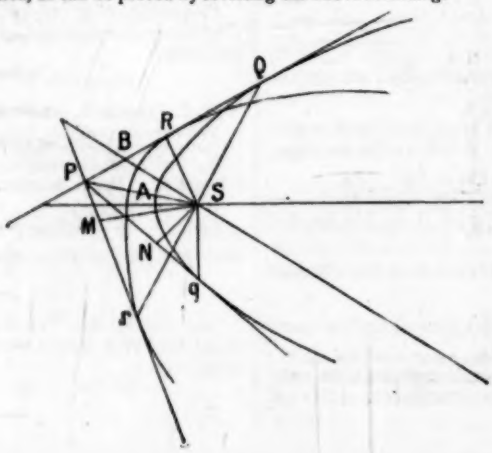
Similarly it can be proved that *pr* is one-fourth of PR, and *rq* is one-fourth of RQ.

Hence draw any straight line GH; bisect it in K, and draw BK its diameter.

Through B draw BL parallel to GK, and equal to twice *pr*; and through L draw LP parallel to the axis.

Through P draw PQ, PR parallel to D and E respectively.

Then PQR is the triangle required, as can be proved by reversing the above reasoning.



(*b*) Let AS be the axis of one parabola, and BS that of the other.

Let PRQ be the common tangent, and Pq, Pr the other tangents on the parabolas, and let SN, SM be the perpendiculars on these tangents.

$$SP^2 = SQ.Sq = SR.Sr,$$
$$\therefore Sq : Sr = SR : SQ.$$

Since SN and SM are perpendicular to the tangents, they intersect the tangents at A and B respectively.

$$\therefore SN^2 = SA.Sq,$$
$$\text{and } SM^2 = SB.Sr,$$
$$\therefore SN^2 : SM^2 = SA.Sq : SB.Sr,$$
$$\text{But } Sq : Sr = SR : SQ,$$
$$\therefore SM^2 : SN^2 = SB.SQ : SA.SR.$$

But SB, SQ, SA, SR are all independent of P.

$$\therefore SM^2 : SN^2 \text{ is constant,}$$

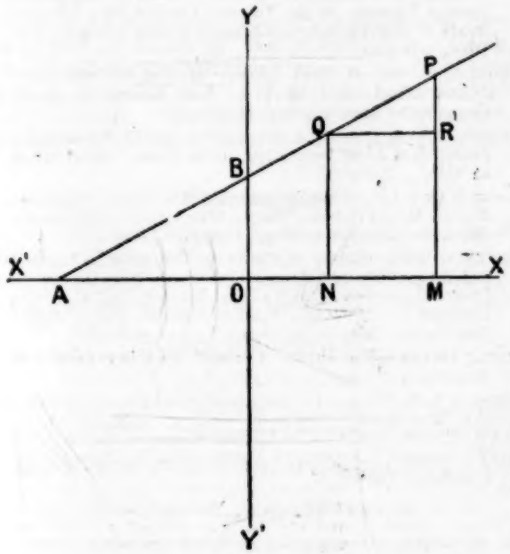
Wherefore SM and SN are in a constant ratio.

2. ICH DIEN. — Explain the geometrical meaning of the constants in the equation of a straight line in the form

$$\frac{x-h}{\cos\theta} = \frac{y-k}{\sin\theta} = r,$$

and establish the equation of the straight line in this form.

(*Intermediate Arts*, 1885.)



Let Q be a fixed point in any straight line AB, and h and k its co-ordinates.

Let P be any other point in the straight line, and x and y its co-ordinates.

Let QP = r, and angle BAX = θ.

$$\text{Then } \frac{x-h}{r} = \frac{OM - ON}{QP} = \frac{NM}{QP} = \frac{QR}{QP}$$
$$= \cos PQR = \cos\theta,$$
$$\therefore \frac{x-h}{\cos\theta} = r.$$
$$\text{And } \frac{y-k}{r} = \frac{PM - QN}{QP} = \frac{PM - RM}{QP} = \frac{PR}{QP}$$
$$= \sin PQR = \sin\theta,$$
$$\therefore \frac{y-k}{\sin\theta} = r.$$
$$\text{Wherefore } \frac{x-h}{\cos\theta} = \frac{y-k}{\sin\theta} = r.$$

The constants h and k are the co-ordinates of a fixed point in the straight line, and the constant θ is the ang'e made by the straight line with the axis of X.

3. ROSA. — Dunstan's Manual of Music, published by J. Hughes, is the book you should get. There is no reason why you should not write well if you try. But you must be content to learn. The large-hand is legible, so is the small-hand. We cannot say more. If you want advice use Cowham's Copy Books (J. Hughes), especially the numbers recommended in last month's magazine. Practise half an hour a day, and send us specimens in six months.

4. STUDENT. — You should spend an hour a day at it for a year. You could use Smith's Principia, Part I. and Part II., or instead of Part I. you can use Abbot's Via Latina.

5. STUDENT.—Yes. There is no age restriction.

6. SCRIPTURE. — Canon Daniel's book on the Liturgy would most likely be a little too full; but it is an excellent book and you would do well to get it and study it.

Arithmetic.

1. NAPOLEON.—If a snail on the average creep 2 ft. 7 in. up a pole during 12 hours in the night, and slip down 16 in. during the 12 hours in the day, how many hours will he be in getting to the top of a pole 35 ft. high? (*Barnard Smith.*)

The snail advances at the rate of (2 ft. 7 in. — 16 in.), or 15 in., in every 24 hours, except for the part left after the last day.

$$35 \text{ ft.} \div 15 \text{ in.}$$
$$= 35 \text{ ft.} \div 1\tfrac{1}{4} \text{ ft.}$$
$$= 28;$$

As the snail creeps up 31 in. during the night, 30 in. remain after 26 days;

$$\text{Time to creep up the last 30 in.} = \tfrac{30}{31} \text{ of 12 hrs.}$$
$$= \tfrac{360}{31} \text{ hrs.}$$
$$= 11\tfrac{19}{31} \text{ hrs.;}$$
$$\therefore \text{Total time} = 26 \text{ days } 11\tfrac{19}{31} \text{ hrs.}$$
$$= \underline{635\tfrac{19}{31} \text{ hrs.}} \text{ Ans.}$$

Algebra.

1. NOLI ME TANGERE.—A person bought a certain number of eggs, half of them at 2 a penny, and half at 3 a penny; he sold them again at the rate of 5 for two pence, and lost a penny by the bargain; what was the number of eggs?

(*Todhunter's* 'Algebra for Beginners.')

Let x = number of eggs,

$$\text{Then } \left(\frac{x}{2} \div 2\right) = \text{Cost price of first lot in pence,}$$
$$\left(\frac{x}{2} \div 3\right) = \text{,, second ,,}$$
$$\text{And } \left(x \div \tfrac{5}{2}\right) = \text{Selling price of all in pence;}$$
$$\left(\frac{x}{2} \div 2\right) + \left(\frac{x}{2} \div 3\right) - \left(x \div \tfrac{5}{2}\right) = 1$$
$$\frac{x}{4} + \frac{x}{6} - \frac{2x}{5} = 1$$
$$15x + 10x - 24x = 60$$
$$\therefore x = 60.$$
$$\therefore \text{Number of eggs} = \underline{60}. \text{ Ans.}$$

Trigonometry.

1. T. W.—From any point within a regular polygon of n sides let fall a perpendicular upon each of the sides; show that the sum of these perpendiculars is equal to the radius of the inscribed circle of a regular polygon of the same number of sides as the original polygon, but having a perimeter n times as great. If regular polygons of n and $2n$ sides have the same perimeter, prove that the radius of the circle circumscribed about the first is a third proportional to the radii of the circles inscribed in and circumscribed about the second polygon.

(Science and Art.)

(a) Let side of polygon $= 2a$. The polygon can be divided into n triangles by lines drawn to the angular points from any point within it.

Area of each triangle $= \frac{1}{2}$ side $\times$ perpendicular
$= a \times$ perpendicular;
$\therefore$ Area of polygon $= a \times$ sum of perpendiculars;
But area of polygon $= na^2 \cot \frac{\pi}{n}$,

$\therefore$ Sum of perpendiculars $= na \cot \frac{\pi}{n}$.

The radius of a circle inscribed in a regular polygon of n sides whose sides are each $2na$

$= na \cot \frac{\pi}{n}$.

$\therefore$ Sum of perpendiculars $=$ radius of inscribed circle of a regular polygon of n sides, but having a perimeter n times as great as the first polygon.

(b) Let r = radius of inscribed circle of second polygon,
And R^1 and R = radii of circumscribed circles of first and second polygons,
Also let $2a$ = side of first polygon,
Then a = ,, second ,, ;

$$\therefore r = \frac{a}{2 \tan \frac{\pi}{2n}},$$

$$R = \frac{a}{2 \sin \frac{\pi}{2n}},$$

$$R^1 = \frac{2a}{2 \sin \frac{\pi}{n}} = \frac{a}{\sin \frac{\pi}{n}}.$$

Third proportional to r and R

$$= \left(\frac{a}{2 \sin \frac{\pi}{2n}}\right)^2 \div \frac{a}{2 \tan \frac{\pi}{2n}}$$

$$= \frac{a}{2 \sin^2 \frac{\pi}{2n} \div \tan \frac{\pi}{2n}}$$

$$= \frac{a}{2 \sin^2 \frac{\pi}{2n} \times \frac{\cos \frac{\pi}{2n}}{\sin \frac{\pi}{2n}}}$$

$$= \frac{a}{2 \sin \frac{\pi}{2n} \cos \frac{\pi}{2n}}$$

$$= \frac{a}{\sin \frac{\pi}{n}}$$

$= R^1$.

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Publications Received.

BACON, G. W., & Co.—Standard Diagram Series, Sheets 1, 2 and 3; Memory Map Slates.

BELL, G., & SONS.—Cæsar's Commentaries, Book III. (*Long and Shilleto*); Latin Prose for London Students (*Baker*).

BLACKIE & SON.—Laugh & Learn (*Jennett Humphreys*); Flower Painting for Beginners (*Ethel Nisbet*); British Landscape and Coast Scenery (*E. Duncan*); Marine Painting (*E. Duncan*); Blackie's Cyclopædia, Vol. IV. (*Dr. C. Annandale, M.A.*); How to teach Drawing in Elementary Schools (*T. R. Ablett*); Outlines of the World's History (*Sanderson*):—Ancient and Oriental History, Greece and Rome, Mediæval History, Modern History.

CLIVE, W. B., & Co.—London B.A. Directory, No. 1, 1889; The Plutus of Aristophanes (*M. T. Quinn, M.A.*); Virgil's Georgics I. and II.—A translation (*F. P. Shipham, M.A.*); Cicero Pro Balbo.

CURWEN & SONS.—Mabel's Songs for Little Singers, Parts 1 and 2 (*G. Nakong*).

FISHER UNWIN, T.—The Century Illustrated Magazine—Christmas Number.

HEYWOOD, JOHN.—28 Examples of the Simple and Economic Shading of Common Objects (*Crowther*); Manchester Science Lectures for the People—Third Series; The Elements of Physiography—Advanced Course (*Prince*); The Paragon Primer.

HOLDEN, A. M.—A New History of England and Great Britain (*Prof. Meiklejohn*); A New Geography on the Comparative Method (*Prof. Meiklejohn*).

LAURIE, T.—A systematic Explanation of the Fundamental principles of Slöjd Instruction, given in the Normal School at Näas.

MACMILLAN & Co.—Shakespeare's Twelfth Night (*Deighton*); English Men of Action—Warren Hastings (*Sir Alf. Lyall*); Elementary Classics:—Virgil, Georgic 1 (*Page*).

MISCELLANEOUS.—Report of Technical Education in England and Wales; Scholars' Mems in Grammar, ditto in Geography (*Nat. Temperance Depôt*); The Worker, No. 1 (*Wells, Gardner & Co.*); Rapid Road to Spanish, Part 2 (*Ralf*); New Patent Calendar for 1890 (*T. Fletcher & Co.*).

NUTT, DAVID.—Elementary German Exercises (*Eve and Zimmern*).

SAMPSON, LOW, & Co.—The Shorthand of Arithmetic (*Jackson*).

SCOTT & MONTAGUE.—Driven to Suicide (*C. Hope Senior*).

SMITH, ELDER, & Co.—The Cornhill Magazine, January.

THE CAMBRIDGE UNIVERSITY PRESS.—The Pitt Press Euclid, I. and II. (*Taylor*).

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Syllabus for Candidates for the Certificate Examination, 1890.

MALES.

THE main provisions will be gathered from the following summary:—

Certificates of the third class will be issued to candidates who successfully pass in the first year's papers, but these do not entitle their owners to take charge of pupil teachers; they may be raised to a higher class by examination in the subjects for second year's students, but only once in every two years.

The following subjects for the second year are formed into groups:—(a) School Management; (b) English; (c) Geography and History; (d) Arithmetic, Algebra, Mensuration, and Geometry; (e) Science; (f) Languages; (g) two of the following: one language, one science, Economy.

All candidates must take (a) and (b), and may take two other groups, but no more.

A student who does not pass with credit at the end of his first year in either or both of the groups (c) and (d) must take it, or them, up again in his second year.

Acting teachers who have not passed with credit in one of the two immediately preceding years in either (or both) of groups (c) and (d) must take it, or them, up again.

Acting teachers who have not been examined in one of the two immediately preceding years, or, having been examined, have failed to obtain a certificate, must take up both groups—(c) and (d).

*Reading and Repetition.

1st Year.—Students and acting teachers must learn 300 lines of poetry from the works of Milton, Byron, Wordsworth or Tennyson. The special books for reading are Shakespeare's 'As You Like It,' and Scott's 'Talisman.'

2nd Year.—Students and acting teachers must learn 300 lines of a play of Shakespeare. The special reading books are 'Golden Treasury of Songs and Lyrics,' Book II., and 'Life of Lord Lawrence,' by Sir R. Temple. The Inspector will also hear the candidates read from a book which he will bring with him.

*Penmanship.

As employed in setting copies in text and small hand; defects in 2nd year's papers being more severely dealt with. The writing in the examination papers is also taken into account.

*School Management.

1st Year.—The general principles of teaching.

The methods of teaching the elementary and class subjects—including drawing.

The training of the senses, and of the memory and intelligence, and the order in which the faculties of children are developed. Notes of Lessons.

2nd Year.—To teach a class in the presence of H.M.I.

The organisation and management of a school.

Registers, and the mode of keeping them.

The processes of reasoning, formation of habits and character, considered in reference to methods of teaching and moral discipline.

Laws of health as applied to premises, scholars and teachers. Notes of Lessons.

Herbert Spencer on Education, Chapters I. and II.

English.

1st Year.—The elements of grammar; the parsing, explanation and analysis of passages selected from Lancelot and Elaine, and from the following 25 of Bacon's Essays: 1, 2, 4, 5, 9, 11, 14—19, 21, 24, 25, 27—32, 36, 38, 39, 50. To write plain prose upon a given subject.

2nd Year.—To paraphrase and also answer questions on the language, style, and subject matter of the books. To write plain prose upon a given subject.

*Geography.

1st and 2nd Years.—Elementary knowledge of (1) Physical Geography with reference to—

(a) shape, size, and motions of the earth;
(b) the atmosphere, rain, clouds and vapour;
(c) wind, currents and tides;
(d) causes which affect climate;
(e) effect of climate on industry, production and national character;
(f) distribution of plants and animals.

(2) General Geography of the British Empire; sketch maps of British Isles, Hindostan and Australia.

English History.

1st and 2nd Years.—1. General outline of English History from 1066 to 1815:

(a) dates and general knowledge of the most memorable events;
(b) reigning houses and dynastic changes.

2. The Tudor Period.

Arithmetic, Algebra and Mensuration.

To work sums mentally and on paper; to prove and explain rules, the figures and methods to serve as models; to answer questions theoretical and practical in Algebra and Mensuration, those in Algebra being confined to the four simple rules, involution, evolution, common measures, common multiples, fractions, surds, ratios, proportion and variation, progressions, simple and quadratic equations of one or more unknowns, to which will be added in the second year permutations and combinations, binomial theorem (for positive integral indices only), logarithms, interest, annuities, and the solution of more difficult equations and problems, and in Mensuration for the first year the measurement of every species of plane rectilineal figure and of the circle, and in the second that of cylinders, spheres and cones, and a few irregular solids.

Geometry.

1st Year.—The first three books of Euclid, with simple deductions, and easy geometrical problems.

2nd Year.—The first four books of Euclid, and the first 17 propositions of the sixth book, with simple deductions from the propositions, and easy geometrical problems.

Economy.

Elementary questions in Political Economy.

Vocal Music.

It is not necessary to give the rather detailed Syllabus, as several Manuals have been written expressly for this course, among others R. Dunstan's covers the requirements of the Department.

Drawing.

Examinations in drawing are held in October by the Science and Art Department. The marks so obtained are carried to each candidate's total.

*Languages.

Candidates may take one or two of the languages specified (Latin, Greek, French, German). The papers will contain grammatical questions and easy passages in prose (in the first year), and in prose and

poetry in the second year. Composition in the languages selected will be required in the second year's papers. The special authors for 1890 are, Cicero, De Amicitia; Virgil, Æneid IV.; Xenophon, Hellenica, Bk. I.; Euripides, Medea; George Sand, La Mare au Diable; Molière, Le Misanthrope; Goethe, Götz von Berlichingen; Schiller, Die Jungfrau von Orleans.

*Science.

An examination is held in Science in Training Colleges in the month of December. This examination is not open to acting teachers, and is only held where there has been a special course of instruction in one or more of the following subjects: Mathematics; Theoretical Mechanics; Applied Mechanics; Sound, Light and Heat; Magnetism; Electricity; Inorganic Chemistry; Animal Physiology; Botany; Physiography; Principles of Agriculture. Except in the case of Mathematics, where there is a special grouping of the stages, the Syllabus for the separate subjects is exactly the same as that for the May examinations, though the number of marks for a pass is higher.

A student must present himself in his 2nd year in any subject in which he failed to obtain at least a 2nd class at the end of his first year. Acting teachers who sit at the Christmas examination will receive additional marks for any two of the specified Science subjects in which they may have obtained a 1st or 2nd class in the advanced stage, or in honours at one of the May examinations held by the Science and Art Department.

FEMALES.

Articles marked thus * in the Syllabus for Male candidates are the same for both Male and Female candidates, with such qualifications as are stated below.

The students of the Second Year will read from The Golden Treasury of Songs and Lyrics, Bk. II., and from Johnson's Lives of Cowley, Milton and Dryden.

School Management.

1st Year—The same requirements as for Male candidates, and, in addition, The Methods and Principles of Infant Teaching and Discipline.

Geography.

The general geography for the first year's students is Europe; sketch maps may be required of the British Isles, Scandinavia, the Spanish Peninsula, Scotland and Ireland.

Second year's students will be examined in the physical, political and commercial geography of the British Empire, the sketch maps being those of the principal British Colonies and Dependencies.

History.

1st Year.—Outline of English History from 1066—1815:

(a) Dates and general knowledge of most memorable events;

(b) Reigning houses and dynastic changes.

2nd Year.—The history of England during the Stuart period, 1603—1688, with special reference to—

(a) Constitutional changes and most important laws;

(b) Military and naval transactions at home and abroad;

(c) The industrial condition of the people;

(d) The literature of the period.

English.

1st Year.—The language, style and contents of the prescribed books.

Parsing and analysis of passages selected from the prescribed poem.

An Exercise in Composition on a familiar subject.

2nd Year.—Analysis, grammar and paraphrase of passages from the prescribed play.

The language, style and allusions in the prescribed books, and the place occupied by the authors in English literature.

An Exercise in Composition.

The prescribed books for 1890 are for the first year Milton's Lycidas, L'Allegro and Il Penseroso, and Hymn on the Nativity; and Macaulay's Essay on Milton. For the 2nd Year Shakespeare's Richard II.; and Trench's Study of Words, Lectures I., II. and III.

Arithmetic.

1st Year.—First Four Rules; Practice and Bills of Parcels; Vulgar and Decimal Fractions; Interest; Simple and Compound Proportion; Mental Arithmetic.

2nd Year.—Application of former rules, with Discount, Stocks and Insurance, and the Extraction of the Square Root.

Domestic Economy.

1st Year.—1. Food: its composition and nutritive value. Its functions: the organs and processes of mastication and digestion.

2. Clothing: materials employed, their cost, care, cleansing and use.

3. The home: its construction, furnishing, warming, lighting and cleanliness.

4. Fresh air: its composition and uses; means for securing proper ventilation; the organs and processes of respiration.

2nd Year.—1. The choice, preparation and due economy of articles of food in common use.

2. The preparation of food for the sick.

3. Household management. Expenses and investment of money. No student of either the first or second year can obtain full marks who does not present a certificate of competency in some specified part of the work comprehended under the name of Industrial training.

Sewing and Cutting-out.

1st Year.—1. The repairing of any plain article of underclothing.

2. The drawing of diagrams on sectional paper.

(a) A woman's chemise.

(b) An infant's shirt.

(c) A pair of drawers for a child of five.

3. The cutting-out and making of the above garments.

4. The answering on paper of questions on needlework.

2nd Year.—1. The higher branches of plain needlework, these include tucking, whipping, and feather-stitching, the repairing of linen and print, and darning in stocking web stitch.

2. The drawing of diagrams on sectional paper:—
A woman's nightdress.
A boy's shirt.
A child's muslin pinafore.

3. The cutting out and making of the above garments.

4. The answering on paper of questions on needlework.

The syllabus for Music, Drawing, Languages, and Science is the same for both male and female candidates. The date of the Certificate Examination is fixed for *December 15th, 1890*, that of the Scholarship Examination for *July 9th, 1890*.

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,
Ex-President of the N.U.E.T.

XV.

IN former papers of this series the specimen essays presented to the student's attention have been written in the general form which avoids the use of the first person singular. There is nothing, however, to prevent a candidate from adopting in his composition exercise the direct personal form without any veiling of himself under the comprehensive 'we,' or the concealment of individual opinions in oftentimes roundabout expressions in the third person.

Some subjects can be best treated from the purely personal point of view, and the employment in such cases of the first personal pronoun enables the writer to narrate his experiences or state his opinions with much greater ease, freedom, and naturalness.

A common form of exercise requires a candidate to describe some special incident in his own life, to give an account of how he spent some particular holiday. If he endeavours to avoid any appearance of egotism in his composition, by careful exclusion of the pronoun I, he may fall into an error of a different kind, but quite as obtrusive and objectionacle—a sort of fantastic affectation of impersonality, where the personal idea of the individual is of the very essence of the exercise.

In illustration of this kind of essay it is proposed to give an account of a school entertainment. The subject is one which may have an interesting and useful bearing on the educational work which this journal seeks to promote in every practicable way.

A SCHOOL ENTERTAINMENT.

It was my good fortune a few days ago to be present at an interesting gathering in connection with an important school. As I had occasion to pay a brief visit to the South of Lancashire, a good friend of mine sent me a pressing invitation to spend a little time with him, and to attend the annual concert given by his scholars. Of this opportunity I availed myself with extreme pleasure to which several circumstances contributed. The place to which I was invited, the City of Manchester, has with strangers the reputation of being dull, and dreary, and depressing; but to me it is endeared by many pleasant memories; and on returning there, after long absence, it was gratifying to find myself in the midst of friends of many years' standing, and to find also that the kindly feelings of mutual appreciation and good fellowship had stood the test of time.

Through rather murky streets, extremely ill-lighted on account of a strike of gas-stokers, I made my way at the time appointed to the Free Trade Hall where the concert was to be given. This Hall, which in its name preserves the memory of an important social movement, holds an honoured place among the many noble buildings with which Manchester has been in recent times adorned by the enterprising municipal spirit of its citizens. It is a building which boasts no ancient foundation, but during its comparatively short existence it has been associated with so much of political and social progress, so many triumphs of music and oratory, that it has already earned its title to be called an historic Hall.

When I entered I found that, in marked contrast to the darkness outside, the fine proportions of the Hall were well shown off by a plentiful supply of light, and the space was crowded with some four or five thousand people who had gathered to listen to the children's performances. On the orchestra round about the great organ were massed some hundreds of boys and girls, and on the platform in front a dozen boys were going through a series of graceful exercises with Indian clubs, keeping time to a pianoforte accompaniment. No one could fail to notice that most of the boys and girls are older than those ordinarily found in public elementary schools, and this suggests that I should say something of the school here represented.

These boys and girls enjoy the privilege, which they should value highly, of being taught at the Manchester Central Higher Grade Board School. This school belonging as it does to the citizens, is an exceptional one, if indeed I may not rather say it is unique among the Board Schools of England. At the same time, I am continually tempted to ask, Why should it be so? In a lofty, imposing, and conveniently arranged pile of buildings in Deansgate is carried on the important work of teaching the 1,200 pupils of this school. None are admitted to it who have not proved their ability to pass the fourth standard of the Government Code. About 400 of the scholars having passed Standard VI. have been constituted into Science and Art Schools for which the upper stories of the building have been specially and elaborately adapted. The examination of these pupils under the Science and Art Department shows some remarkable results. During the present year (1889), more than twelve hundred Science Certificates have been gained in the elementary, advanced and honours stages, and more than two hundred second grade Art Certificates. Two of the boys having passed in the advanced stage of fourteen Science subjects have been awarded special honours—one a National Scholarship of £60 a year for three years, the other a Royal Exhibition of £50 for three years. Five Foundation Scholarships at the Manchester Grammar School, and nearly forty

Elementary School Scholarships have also been gained by pupils this year; while three have passed either the preliminary examination of the Victoria University, or the Matriculation of London. The value of the prizes and scholarships gained by pupils from this school during the year is nearly one thousand pounds.

It may appear that I am wandering from my subject; but most of the facts I have stated, and many others, were given in a carefully condensed report which was read by the chairman immediately on the conclusion of the Indian club drill, as a preliminary to the distribution of the prizes; and this, to many present, was of course a most important part of the school entertainment.

The business proceedings were, very properly, brief. They were, however, long enough for a little passage of arms, in which my good friend the headmaster took occasion to remark that the attendance of the scholars was so satisfactory that instead of having to beg the parents to send their children regularly to school, he had only to thank them for their constant and thorough co-operation, and to state that the absence, except that from purely unavoidable causes, did not exceed two per cent. Among those who appeared to receive prizes were one scholar who had not been absent once for seven years, and another who had been perfectly regular for six years.

After this statement of results, I feel it would be presumptuous for me to add words of praise and approval respecting the work of my dear old friend Mr. Scotson, and of the band of helpers he has gathered round him in such a remarkable organisation. I cannot, however, help attributing the great success of the school to his kindly genial manner, his active energetic spirit, and his powerful personal influence. Neither can I help reflecting on the immense good he has done to his native town by the continued exercise of that influence over the thousands of pupils who have been under his charge in his present position, and in that older school, now gone, with which his life and work from early childhood have been knit up, and from which this Central School has sprung.

If the Manchester School Board and the teaching staff have reason to be proud of the success of this school, the ratepayers have reason for further satisfaction in the knowledge that the pupils' fees and the government grants together suffice for the whole annual cost of maintenance, the only charge on the rates being that for paying off the cost of site and building.

After the speaking and prize-giving comes the entertainment proper. This opened with Dr. Stainer's anthem 'What are these?' which was sweetly sung and accompanied on the organ. Next a girl with a pure rich voice, and pleasant unassuming manner, sang Behrend's pathetic song 'Daddy.' Then a recitation was given by a boy and girl with old-time wigs, the piece selected being a scene from the 'School for Scandal.' Well rendered as this was, I have some doubt as to its suitability for a children's programme. Cynical and frivolous ways of looking at the serious things of life will come soon enough. 'The Soldiers' Chorus' from Faust is an inspiriting one, but in its high range it makes too great a demand on children's voices, and is less effective accordingly. The air 'O Thou that tellest,' from the Messiah, was nicely sung by one of the boys.

I must not, however, attempt to go through all the items of the programme. The most noticeable features were the numbers from Sir Arthur Sullivan's operas 'The Mikado' and 'The Yeomen of the Guard.' From the latter were given with good effect, the song 'I have a song to sing O,' the pleasing Madrigal, 'Tower Tomb,' and the duet 'Cock and Bull'; from the former, the song and chorus 'Daughter-in-law elect,' and 'My object all sublime.' In these pieces there are some points which very strongly suggest appropriate actions, but these have to be avoided, as it is only on this condition that permission can be obtained to give selections at concerts.

Another feature in the programme was a comic recitation in French, 'Les Deux Aveugles.' The boys who did this entered thoroughly into its spirit, and seemed quite at home in the language. The favourite song 'The Midshipmite,' with a rowing chorus, was very effective; so also were some simple sacred quartets, and Parry's glee 'Come, Fairies trip it,' and a chorus 'Our hearts are light,' from Offenbach.

Twenty-four girls went through a series of pretty movements to music, the exercises being a Manchester adaptation of Swedish drill; and at the close, another set of girls performed some ring drill, which appeared to afford excellent exercise for the muscles.

In so large a hall, it might perhaps be advisable to give a larger proportion of choral music, and fewer solos; as the latter often put some strain upon young voices, and on the ears and attention of a large and crowded audience. Other reasons occur to me for making this suggestion. In the first place, it is not every school that can supply such a large number of well-formed voices; and it is a pity therefore that they should not have full opportunity of proving their quality. Again, it must be admitted that individual singing sometimes tends to an undue development of vanity in young performers; whereas part-singing forms a fine field for the exercise of moral discipline; since a due subordination of every part and every singer is essential to a satisfactory general effect.

As often happens, the programme was found to be rather long; and as my friends and I emerged into a dense fog through which cabmen could scarcely find their way, we could hardly help thinking of the difficulty many would have to get home. Much pleasure, however, had been enjoyed, and will doubtless recur in memory to the young folks who had shared in it; and the Scholarship Fund of the Manchester School Board would reap much advantage from this display of youthful talent.

Science Notes.

PROFESSOR Sedgwick has recently offered £1,500 toward the completion of the new buildings required at Cambridge for the teaching of Physiology, on the condition that they are commenced forthwith. A scheme has therefore been devised and recommended by which the additional rooms can be provided.

THE University of St. Andrew's has lately received a magnificent bequest. No less a sum than £100,000 has been given to it by Mr. David Berry, who has inherited the fortune of his late brother, Dr. Alexander Berry, a former student of St. Andrew's. The legacy will not come into possession before 1894, but the prospect of such a considerable addition to its revenues will give new hope and vigour to the institution.

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THE Manchester Field-Naturalists' Society has formed a special committee to ascertain what trees, shrubs, and plants, are likely to grow in the squares and open spaces of the city. Hopes are entertained that if a judicious selection is made, an attempt to brighten and beautify the town by the presence of shrubs and flowers would be attended with success.

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THE Berlin Society for Ballooning is about to try a new method of ascertaining the temperature of the air at great heights. The idea is to send up small balloons at night. These will contain thermometers so made as to give a light signal when certain temperatures have been reached. The light will affect a so-called photo theodolite, while the height then attained will be indicated in a mechanical way. Should this method give satisfactory results, it may be possible to arrive at more exact results for the decrease of temperature with elevation above the sea level.

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AMONG the most important scientific deliverances of last month has been Sir Wm. Thomson's eulogium upon his friend. Speaking of the loss of one of the greatest workers in electrical science and its practical applications that the world had ever seen—Joule—he said that the great scientific discoveries of Faraday, which were prepared almost deliberately for the purpose of allowing others to turn them to account for the good of man, had been going on for about 15 years, when a young man took up the subject with a profound and penetrating genius most rare in any branch of human study, and perceived relations with mechanical powers which had never been suspected before. Joule saw the relations between electricity and energy; this very first determination of the mechanical equivalent was an electrical measurement. His communication to the British Association, when it met at Cork in 1841, pointed out, for the first time, the distinct mechanical relations between electrical phenomena and mechanical force. Joule was not merely a visionary who saw and admired something in the air, but he pursued what he saw to the very uttermost practical point of work; he it was who determined the mechanical equivalent of heat. Both in electricity and mechanical action he laid the foundation of the great development of thermo dynamics, which would be looked upon in future generations as the crowning work of the present century. It was not all due to Joule, but he had achieved one of the very greatest monuments of scientific work in the present century. For the Institution of Electrical Engineers it was interesting to think that the error relating to one of the most important electrical elements, the unit of resistance, now called the ohm, as determined electrically in the first place, by the Committee of the British Association, by purely electrical methods, was first discovered by Joule's mechanical measurement. It was Joule's mechanical measurement which first corrected the British Association unit, and gave the true 'ohm.'

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The revolution in the social life of many workers which it is possible electricity may effect was perhaps never more clearly put than by the Prime Minister in a speech before the Society of Electrical Engineers. 'The event of the last century was the discovery of the steam engine. But the steam engine was such that the forces which it produced could only act in its own immediate neighbourhood, and therefore those who were to utilise its forces and translate them into practical work, were compelled to gather round the steam engine in vast factories in great manufacturing towns and in great establishments, where men were collected together in unnatural and often unwholesome aggregations. Now an agent has been discovered by which the forces of the steam engine, still confined to its own centre, can be carried along far away from its original sources to distances which are already great, and which science promises to make more considerable still. I do not despair of the result that this distribution of forces may scatter those aggregations of humanity which I think it is not one of the highest merits of the discovery of the steam engine to have produced. If ever it does happen that in the house of the artisan you can turn on power as you can now turn on gas—and there is nothing in the essence of the problem, nothing in the facts of the science as we know them, that should prevent such a consummation from taking place—if ever that distribution of power should be so organised, you will then see men and women able to pursue in their own homes many of the industries which now require the aggregation of the factory; you may, above all, see women and children pursue these industries without the disruption of families which is one of the most unhappy results of the present requirements of industry. And if ever that result should come from the discoveries of Versted and Faraday you may say that they have done more than merely to add to the physical forces of mankind. They will have done much to sustain that unity, that integrity of the family upon which rests the moral hopes of our race, and the strength of the community to which we belong.'

Certificate Examination, 1888.

FIRST AND SECOND YEARS.

English History.

3. What were the relations between England and Scotland in the times of Edward I., Cromwell, and George II.? When, and under what provisions, were Scotland and Ireland respectively united to England? State the character of English legislation in Ireland during the reign of Queen Anne.

(3) In the reign of Edward I., there were several claimants to the Scottish crown, Baliol and Bruce being the chief. Edward arbitrated in favour of Baliol, claiming homage as Scotland's Overlord. Joining France against England, Baliol was worsted, and deposed, and Scotland became a fief of the English crown. Wallace and Bruce revolted. Bruce was crowned king at Scone, Scotland was laid waste by Edward's son, and then gradually recovered from the English.

Scotland decided in favour of Charles II. on the death of Charles I. Cromwell invaded it and gained the battle of Dunbar in 1650, Charles crossing the border into England. General Monk brought Scotland into subjection, and after the establishment of the Protectorate, representatives sat in the parliaments called by Cromwell.

During the reign of George II., the French fitted out a fleet in 1744 to aid the Young Pretender in obtaining the English throne. It was dispersed by a storm, but Charles effected a landing in the Highlands in 1745. At Prestonpans he defeated Sir John Cope, advanced to Derby, and then retreated, besieged Stirling, gained the battle of Falkirk, and was finally defeated at Culloden, 1745.

The union of the crowns of Scotland and England took place on the accession of James I. in 1603. That of the parliaments took place in 1707, after the Act of Union had been passed by means of unstinted bribery. The religious establishments and laws and customs of each were to remain unaltered, but there was to be one parliament, to which Scotland should send 45 members and 16 elected representative peers. A national flag was adopted, combining the crosses of St. Andrew and St. George.

Ireland was conquered in 1172, but its parliament was not united to that of England till 1801, similar methods being adopted to procure the union as were used in Scotland. Ireland was to send 100 members to parliament and 32 peers to the House of Lords.

In the reign of Queen Anne many Irishmen were imprisoned for taking part in the attempted invasion of Scotland by the Pretender, and the policy of the English was generally one of repression.

4. What wars have been waged between England and France from 1688 to 1815? What was the immediate cause of quarrel in each case, and by what treaties were they terminated! State briefly the importance of the Battles of Blenheim and the Nile, drawing a sketch map of the latter.

(4) 1689—1697—William III.

The aid rendered by Louis to James the Pretender, and the desire to curb his power by Germany, Holland, Spain, and Prussia. Treaty of Ryswick, 1697.

1702—1713—Anne—War of the Spanish Succession. After agreeing to the treaties which divided the Spanish dominions on the death of Charles II. of Spain, Louis succeeded in securing the Crown of Spain for his grandson. To prevent this succession and curb Louis's power, William joined the Second Grand Alliance. Anne joined heartily in the Alliance. Treaty of Utrecht, 1713.

1740—1748. War of the Austrian Succession. In 1740, Charles VI. left his dominions to Maria Theresa, his daughter. This arrangement had been agreed to by Great Britain and other European powers. The elector of Bavaria, however, claimed Austria, and France helped him. England sent help to Maria Theresa. Treaty of Aix-la-Chapelle, 1748.

1756—1763. Seven Years' War.

The French determined to check the growing supremacy of England on the American continent. Treaty of Paris, 1763.

1793—1802. War of the French Revolution.

Fear of Republican principles and their spread to England, and the beheading of Louis, followed by declaration of war against England. Treaty of Amiens, 1802.

1803—1815. Peninsular War.

A dispute with Napoleon about Malta, which island the English would not give up. In addition, and chiefly, alarm and anger at the increasing power of Buonaparte. Treaty of Paris, 1815.

The victory of Blenheim was important, inasmuch as it checked Louis in his career of conquest, and prevented him during the remainder of the war from acting except on the defensive. His name ceased to be a terror to the Protestant countries of Europe. Bavaria submitted to the Emperor, and Germany was no longer threatened by France.

The Battle of the Nile crippled Napoleon's resources. It prevented his designs on India; it revived the drooping spirits of the anti-Gallican Party in Europe, and filled England with joy. It left Napoleon with only such limited military stores as he had been able to land, and cut off for a time his communication with France.

5. What was the cause of dispute between Henry II. and Becket, John and the Pope, Edward I. and the clergy? What persecuting Acts were passed in the reigns of Charles II. and Anne, and when were they repealed?

(5) *Henry II. and Becket.*—The quarrel between these two was on the subject of Church courts. Henry wished to bring the ecclesiastics under the jurisdiction of the ordinary courts, which Becket strongly opposed. He seemed to agree by giving his assent to the Constitutions of Clarendon, but soon drew back. Becket, in fear, fled to foreign countries.

John and the Pope.—The dispute between John and the Pope arose on the question whether the monks of Christ Church alone, or in conjunction with the bishops of the province, had the right to elect the Archbishop of Canterbury. The Pope decided for the monks alone, who elected Langton. John was enraged, for he had selected another man, and refusing to accept Langton, the country was laid under an interdict.

Edward I. and the Clergy.—Edward was in great straits for money, and one year he demanded of them half their incomes. On their refusal of his demand he outlawed them.

Charles II.—The Corporation Act, 1661; repealed 1828. Act of Uniformity, 1662. The Conventicle Act, 1664. The Five Mile Act, 1665. The Test Act, 1673; repealed 1828.

Anne.—Act to prevent Occasional Conformity, 1711. The Schism Act, 1714; did not come into force.

6. State clearly, with dates, the principal facts connected with any three of the following:—Simon de Montfort, the Earl of Chatham, Robert Blake, and Nelson; and answer *one* of the following questions:—

(*a.*) In what way was the power of the nobles affected by the Crusades, the Wars of the Roses, the Reformation?

(*b.*) What were the chief causes which led to the separation of the American colonies?

(6) *Simon de Montfort.*—He was a Frenchman who had obtained the Earldom of Leicester, and married the king's sister. He headed the barons in their demand to reform the government, and helped to draw up the 'Provisions of Oxford,' 1258. He overthrew the royal forces at Lewes in 1264, and became virtual ruler of England. Called a parliament from the cities and boroughs in 1265. Being deserted by the Earl of Gloucester he was defeated and slain at Evesham in 1265.

Earl of Chatham.—Began life as a cornet of dragoons, and in 1735 entered parliament. Joined the 'patriots,' and for opposing the taking of Hanoverian troops into British pay he lost his commission. In 1756 he was made Secretary of State, but being disliked by the king was dismissed. In 1757 he again became minister, and the fortunes of England abroad immediately improved. Resigned office when the ministers refused to declare war against Spain in 1757. Became premier and Earl of Chatham in 1766. He protested strongly against the taxation of the colonies, and made strong speeches on the conduct of the war. He protested against the independence of the colonies. He died 1778.

Robert Blake.—First came into notice by holding Lyme Regis against Prince Maurice, 1644. Afterwards appointed Admiral of the Fleet. After being once defeated by Van Tromp he overcame the Dutch in three battles, 1653. From the Grand Duke of Tuscany he enforced reparation for damage done to English commerce, and burned the Moorish pirate vessels in the Bay of Tunis, 1655. In 1656 he seized Spanish treasure-ships in the harbour of Santa-Cruz, and died on board his ship in 1657.

Nelson.—Son of a Norfolk clergyman. Served as midshipman, lieutenant, commodore, and admiral in the British fleet. In the battle of St. Vincent took two ships, 1797. Was sent to destroy the French fleet, and succeeded in doing so at the battle of the Nile, 1798. At the battle of Copenhagen in 1801 a victory was gained through his tact and courage. He attacked the French and Spanish fleets off Trafalgar in 1805 and completely defeated them, but was killed in the action.

(*a*) During the absence of Richard on the third crusade, the power of the nobles was greatly increased, showing itself shortly after in the demand for Magna Charta.

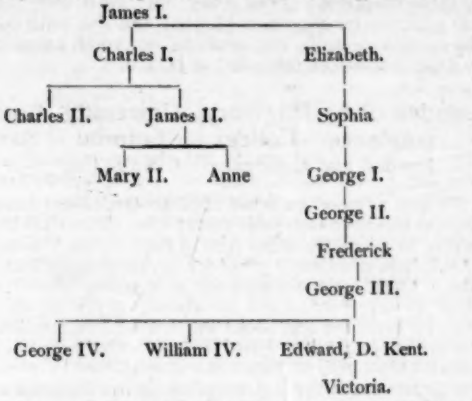
In the Wars of the Roses the greater part of the nobles were slain, and the power of the king became greater, appearing in the arbitary conduct of the Tudor kings.

The Reformation, largely effected in England during the minority of Edward VI., on the whole served to restore to them the power they had enjoyed before the Wars of the Roses.

(*b*) In 1765 the English parliament placed a duty on stamps in America. This caused ill feeling, as the colonists denied the right of the English parliament to tax them, as they were unrepresented there. In 1766 the Act was repealed, but in 1767 duties were imposed on tea, glass, paper, painters' colours, &c. In 1770 all these were removed, except the duty on tea. Refusing to pay this the American war began, 1775. In 1776 the colonies declared their independence.

7. Draw a genealogical table showing the descent of Queen Victoria from James I. What connections have been formed with foreign reigning houses by the marriages of her children? What foreign possessions passed from the British Crown at her accession, and of what power has it since become possessed?

(7)



The Prince of Wales married Princess Alexandra, eldest daughter of the King of Denmark.

The Duke of Edinburgh married Marie, daughter of the Emperor Alexander II. of Russia.

The Princess Victoria married the Crown Prince of Prussia, afterwards Frederick II., Emperor of Germany, who was succeeded on his decease by his son, the reigning sovereign, William II.

The Royal Family are also related to the rulers of the small States of Schleswig-Holstein, Hesse-Cassel, Waldeck.

The Kingdom of Hanover, which passed to her uncle Ernest, Duke of Cumberland.

The Queen was created Empress of India in 1877, and the British possessions have been extended chiefly in Africa and India.

8. (*a*) What expansion of our Indian Empire took place between 1848 and 1856? What change was made in the Government of India subsequent to the Mutiny? State clearly the importance to England of the Suez Canal.

(*b*) Name the principal British explorers during this reign, with their achievements.

(8) (*a*) From 1848 to 1856 Lord Dalhousie was Governor-General of India. The second Sikh War, which took place during the period, resulted in the annexation of their country, followed shortly after by that of Tanjore. The second Burmese War added the whole of the coast of Burmah. In 1849 Satara, and in 1853 Jhansi were annexed. In the latter year the last of the Mahratta Princes of Nagpur died, and his territory became the Central Provinces. In 1856 Oudh was annexed.

In 1858 the 'Act for the better government of India' received the Royal assent. By it all the territories heretofore under the government of the East India Company were transferred to Her Majesty the Queen, and all the powers hitherto exercised by that company, and by the Board of Control, were vested in the Secretary of State for India.

The Suez Canal is the nearest and most direct route to our Indian possessions. Its existence is a source of great gain in the saving of time and freight. It proved of service in a military sense during the Egyptian war.

(*b*) Sir John Franklin, 1845, N.W. Passage. Maclure and McClintock, 1858, search for Sir John Franklin. Sir James Ross, 1844, determined the position of magnetic pole in Antarctic Ocean. Livingstone, 1849 to his death, Lake Ngami, Zambesi, Victoria Nyanza, Upper Congo. Cooley, 1845, Lake Nyassa. Burton and Speke, 1857, Lake Tanganyika. Grant and Sir Samuel Baker, Upper Nile. Stanley, Congo, Albert Nyanza. Eyre, Sturt, Grey, Lushington, Rae, and others, interior of Australia.

9. What was the origin of the Crimean War? Draw a rough sketch map of the Seat of War. Describe briefly the battles of Balaclava and Inkerman. What special achievements are connected with Silistria and Kars?

(9) Napoleon III. demanded for the Latin Monks a key to the great door of the church at Bethlehem, and the privilege of erecting a star bearing the arms of France in the church. The Sultan yielded to his demands, and as this seemed to place the Latins above the Greeks, at whose head was the Emperor of Russia, Nicholas despatched an army of 150,000 men towards the Turkish frontier. As the above cause of enmity was too slight a reason for war, he sought another in a claim for a treaty which would virtually give him a Russian protectorate over three-fourths of the people of Turkey. The Sultan refused the application, and as the Emperor, after attempts had been made by various powers to mediate, refused to withdraw his troops from Turkey, the Sultan declared war.

Balaclava.—(25th Oct., 1854.) The allied armies had invested Sebastopol. The Russians determined to prevent their receiving supplies from the harbour at Balaclava and to relieve the town. They therefore attacked four redoubts held by Turks, who cowardly fled. A large body of Russian horsemen then moved towards the British forces. They were received by the 93rd Highlanders, and with the aid of the Scots Greys and Inniskillens, the Russian cavalry were completely routed. Towards the close of the battle occurred the charge of the light brigade, through a misinterpretation of an order of Lord Raglan.

Inkerman.—(Nov. 5th, 1854.) A large body of Russians occupied a good position near a weak part of the allied lines during the early morning. For a long time the British, greatly outnumbered, warded off the attacks, and then with the aid of the French drove the Russians back.

Silistria.—Beseiged in 1854 by 30,000 Russians: stormed and assaulted vigorously on 9th and 13th June by Prince Gortschakoff, who was repulsed and the Russians were compelled to retreat. Butler and Nasmyth (British) ably assisted the garrison.

Kars.—Defended by Fenwick Williams with 15,000 men against 50,000 Russians for nearly six months. On Sept. 29 6,000 Russians were killed in an attack on the town, which capitulated through famine alone on 28th Nov.

10. What policy was adopted by England during the American Civil War? What events nearly led this country into war with the Northern States? In what way did the war affect us commercially? What were the Alabama claims, and how were they settled?

(10) A policy of neutrality. Sympathy was felt by the wealthy classes generally for the Southern States. The government was apathetic and careless, and allowed the *Alabama*, a ship of war, to be built in England, and to escape. Captain Wilkes, of the U.S. Navy, forcibly took Messrs. Slidell and Mason from the Royal British mail steamer, *Trent*. Great excitement and anger were thus caused in England, as the action respecting the *Alabama* caused anger in America. The war in America prevented attention to the growth of cotton. Our supplies from that continent were entirely cut off, and great distress prevailed in Lancashire and the whole of the cotton manufacturing districts. Trade in cotton was greatly depressed.

The Alabama Claims arose out of the depredations of the *Alabama*, a steam vessel of 900 tons, built at Birkenhead in 1862, which did great damage to the North-American shipping till she was sunk by the *Kearsage*, off Cherbourg, in 1864. After a long and exciting discussion between the two Governments, a Commission was appointed, which met at Geneva, in June, 1872. Representatives of Italy, Switzerland, Brazil, and the contending countries settled that Great Britain should pay three million pounds for the direct damage done. In 1873 the money was paid. This is the first instance of a great International dispute being settled by arbitration.

11. What events during the reign of Victoria are connected with the following names—Jelelabad, Hong Kong, The Sobraon, Goojerat, Rorke's Drift, Magdala; O'Connell, James Stephens and Fenianism; Chalmers and the Veto Act? Give dates in all cases.

(11) *Jelelabad*, defended by Sir Robert Sale in 1842 during Abyssinian War.

Hong Kong ceded to Great Britain after the first Chinese War, 1841, having been captured by Captain Elliot in 1839.

The Sobraon.—Attack by Sir Hugh Gough on the Sikh force in 1846. The Sikhs dislodged, and many thousands killed or drowned in the Sutlej.

Goojerat.—Lord Gough defeated the Sikhs in 1849.

Rorke's Drift.—In 1879 a few British soldiers successfully resisted a large Zulu army. It is near the boundary of Natal and Zululand.

Magdala stormed by the British on Easter Monday, 1868, after the King of Abyssinia had been repulsed with great slaughter. Totally destroyed.

O'Connell, connected with the agitation for Catholic Emancipation in 1829, and with the agitation for the repeal of the Union in 1844.

James Stephens and Fenianism.—Fenianism is said to have been begun by Stephens in 1858. Its object was to liberate Ireland and establish a republic. Stephens was 'head centre.' Risings took place in various parts of Ireland, raids were made on Canada, and many Fenians were imprisoned (1865-71). Stephens was captured but escaped, 1865.

Chalmers and the Veto Act.—The disruption of the Church of Scotland in 1843, caused by the civil courts over-riding the power of the church courts, the Veto Act not having prevented the induction of persons to livings in Scotland who were obnoxious to the majority of the parishioners.

12. What great legislative changes have been made regarding Education and Commerce between 1837 and 1880? Who were principally concerned in them? Describe the steps passed through by any measure introduced in the House of Commons before it becomes law.

(12) The Committee of the Privy Council on Education was formed in 1839, and since that time increased aid has been granted to public elementary schools. Till 1870, when Mr. Forster's Education Act was passed, the aid was given to various religious denominations. This Act provided for the compulsory provision of School accommodation for every child in the country of the class requiring elementary schools. Acts amending and extending its provisions were passed in 1872, 1873, and 1876, the last being introduced by Lord Sandon, and providing for the compulsory attendance of every child, not otherwise educated, at an efficient school. Two Royal Commissions (1858, Duke of Newcastle; 1887, Lord Cross) have sat. Public Schools Acts passed in 1868, 1869, 1870, and 1873. Restrictions on the entrance of Dissenters to Universities removed by Universities' Act passed in 1877.

The repeal of the Corn Laws in 1846 (Sir Robert Peel) gave great impetus to imports. Repeal of the Navigation Laws in 1849. An important commercial treaty was entered into with France (Mr. Cobden) in 1860, and has very largely increased our trade with that country.

Leave is asked and given to bring in a Bill. It is then printed and read a first time. If there is strong opposition to it, the debate on the principles it enunciates takes place on the second reading. If the second reading is carried, the bill is committed for consideration of its details, either to a Select Committee or to a committee of the whole House. The bill with amendments is then reported to the House, and is read a third time. It is then forwarded to the House of Lords where it goes through a similar course of procedure. After passing both Houses it receives the Royal assent and becomes law.

(To be continued.)

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Publications Reviewed.

Virgil's Georgics I., II. A Translation by F. P. Shipham, M.A., Univ. Corr. Coll. Tutorial Series. London and Cambridge: Clive and Co.

A correct, faithful, and at the same time often spirited translation, based mainly and wisely on Conington's text and notes, not on his translation, which the writer has apparently carefully—and here again, for his purposes, wisely—eschewed. For Conington's aim was to turn Vergil's poetry into an English prose, which might, in such measure as the conditions allow, preserve the literary grace and poetic sentiment of the original. Mr. Shipham has made it his first object to produce a translation useful to the learner; and it is much to his credit that he has been able to do this without wholly sacrificing the just claims of poetry to the demands of utility. Such lapses as 'doctor their asthmatic old men' (II. 135), or 'a flood of morning callers' (II. 462) are rare, and redeemed by the vigour and grace of passages like the rendering of the last lines of Book II., beginning *Me vero primum dulces ante omnia Musæ*. Of mistakes we have noticed few. We do not believe that 'when the rain-bearing spring *is far spent*' is the true sense of '*cum ruit imbriferum ver*,' in I. 313, and 'gradually *hit upon* the various arts' loses the force of Vergil's *varias extunderet artes* (I. 133). So too *inhiant*, in II. 463, is translated inadequately 'gaze upon,' whilst in II. 508, *hiantem* is fully rendered 'agape with excitement.' There are two or three misprints: 'twist away' for 'twist awry' in II. 247; Licyon for Sicyon in II. 519; and the omission of the comma destroys the meaning of 'youth accustomed to little, worship of the gods', in II. 472.

London B.A. Directory, University Correspondence College Tutorial Series. London and Cambridge: Clive & Co.

This is a most valuable book to those who have to depend to any considerable extent upon themselves in preparing for examination for Arts in the London University. It is cheap, excellently printed, and full of useful information. The table of contents will be a guide. Part I. contains an introduction and an abstract of the regulations. Part II. gives the text books which are recommended for the ordinary subjects. Part III. deals with the special subjects for 1890, both for pass and honours. Part IV. contains the papers set at the B.A. examination in 1889 and Part V. the solutions and answers to all of them, except the special subjects for the year. It is not too much to say, that no student can read the book through without gaining much advantage, while to scores it will be a great boon, whether they avail themselves of the tuition it recommends or not. The answers to the questions are an excellent feature of the work. They are thoroughly well done. We have no doubt that the book will circulate widely as it deserves to do. We wish it much success.

Cicero pro Balbo. Univ. Corr. Coll. Tutorial Series. London and Cambridge: Clive and Co.

If this is a fair specimen—and we think it is—of the work published for the University Correspondence College, that association is doing its part to deserve and probably obtain success. The arrangement of the book is business-like; the notes are full and clearly put; the introduction compresses a good deal of useful information into a very small space. The translation, too, is carefully done, though the necessities of the case have forced the sacrifice of freedom and elegance in many cases in favour of more literal renderings, as being less likely to lead astray the readers to whom the book is chiefly addressed. We have noticed what can hardly be other than a mistake of the editors in the notes and translation of § 6. Cicero's argument is that Pompeius gave Balbus the Roman *civitas* as a reward for good service to the Roman State. If there was any fault, it was that of Pompeius: but the punishment would fall on Balbus, who would lose the reward of his good conduct. The prosecutor, Cicero says, admits that the gift was the reward of merit, but censures it as illegal: so that whilst he accepts as good Balbus's plea of meritorious service (*ut causa ipsius probetur*), he asks that he should nevertheless be penalised; whilst Pompeius, whose defence of his gift he controverts (*in Pompeio causa lædatur*), he lets off scot-free, except as his reputation might suffer. The word *ipsius* must refer to Balbus, not to the prosecutor, as note and translation take it. A parallel use of ipse will be found in § 18: *quos ipsorum inlustravit labor*. In § 20, we think the phrase *non ut de nostro jure aliquid deminueretur* should be translated 'not so as to put any limitation on our prerogative.' The prosecutor had argued that Pompeius' bestowal of *civitas* on Balbus was null, because the consent of his native city, Cadiz, had not been obtained. Cicero replies that the law in question, the *lex Julia*, was not intended to disable the freedom of Rome in dealing with her allies in matters of imperial concernment, but to give them the option, in certain cases where their private interests only were concerned, of consenting or declining to modify their own legal or political arrangements in conformity with those of Rome.

The Plutus of Aristophanes. Edited by M. T. Quinn, M.A. Univ. Corr. Coll. Tutorial Series. London and Cambridge: Clive and Co.

The editor has done his work excellently. The notes are accurate and complete, and are unmistakeably the outcome of sound scholarship and ripe tutorial experience. In his translation the writer has managed to preserve at least some of the spirit and humour of his original; many of the renderings are happy, though amongst these can hardly be counted his version of the pun in line 453, τροπαῖον ἂν στήσαιτο τῶν ταύτης τροπων, 'set up a record to commemorate the re*verse* he inflicted on this woman's *vers*atility.' The main difficulties which the reader meets in Aristophanes are the social and political allusions, and the abundant use of words, names of things such as articles of food, furniture, and so on, which from the nature of the case do not often occur in other authors. For these difficulties the notes make ample provision, nor are the questions of philology and syntax which arise neglected. On this latter point one or two oversights might be remedied, as in the construction of the participle λαχὼν in 277, and the use of μηδὲν in 488. Illustration by parallel is plentiful, as it should be: thus the Persian *daric* is compared with the French *louis and napoleon:* the Aristophanic demonstrative οὑτοσὶ with the Latin *hic-ce*, and French *ce-ci*. The introduction contains what is known of Aristophane's life and work, and discusses the various points of interest connected with this play and with Greek comedy generally, and a description of the arrangements of the Greek theatre. The Greek text is well printed; the type used being small but very clear.

Excelsior School Map of Asia. (Reduced Size.) London: G. W. Bacon and Co.

This is a very excellent production, and although measuring but 30 inches by 40 inches, and very moderate in price, its value from an educational standpoint cannot be gainsaid. Clearness and general suitability for school use have been the objects steadily kept in view in its design and production, and to secure these good qualities every detail has evidently been carefully studied. No attempt has been made to make the map a companion to a gazetteer by cramming it full of names. Maps crowded with names and topographical detail, however useful they may prove at times for the purpose of reference, are, as a rule, unsatisfactory for general school use—except in very special cases. In the map now before us consideration has been paid to the requirements of an elementary course of geography, and only those names suitable for such a course have been inserted. Of course all teachers may not be agreed upon the relative importance of certain names and their connection with such a course; and some may consequently feel inclined to omit details which others would think worthy of insertion, and *vice versâ*. In this respect it may be mentioned that the selection here seems to have been done carefully and well, and to leave little to be decried either in insertions or omissions. A feature by which the legibility and clearness of the map is largely secured consists in the fact that the mountains are coloured light brown instead of the usual black, and consequently, although perfectly distinguishable, do not obscure the names printed in black upon them. The principal steamship routes are indicated, with their terminal distances, and on the meridians time-dials are inserted, whereby little learners may insensibly pick up some useful ideas about the great pathways of commerce, and the time- and space-distances between various points on the earth's surface.

Action Songs. By J. Cliffs and Wade. Manchester: John Heywood.

Contains twenty-four action songs with simple accompaniment. Some of the melodies are pleasing, and will be welcomed by teachers of infant and junior schools. Others are not so good.

Barter's Manual Training Diagrams (Group A). London: Cassell and Co.

This capital series consists of eight plates boldly printed in colours and illustrating some of the joints in most common use in woodwork. From the numerous good qualities possessed, the series should find a ready welcome in all grades of carpenters' shops, from the highest to the lowest—from the model establishment attached to some of our great public schools to the more rough-and-ready workshops in connection with our missions and industrial homes. In fact, wherever the youthful idea is being trained up in the art and mysteries of carpentry, the presence of these plates on the workshop walls would smooth away many difficulties, and would enable the veriest tyro to see and understand at a glance what the most long-winded of verbal explanations would perhaps fail to make quite clear to him. It will of course need a great many more plates before the mysteries of even ordinary carpentry are exhausted, but as will be seen from the following list of the joints illustrated in these eight plates, a very fair and practical commencement has been made. Diagram No. 1 illustrates 'lapped halving'; No. 2, 'single mortise and tenon'; No. 3, 'a bridle joint'; No. 4, 'dovetail halving'; No. 5, 'double mortise and tenon (unwedged)'; No. 6, 'double mortise and tenon (in breadth)' and 'single haunched tenon'; No. 7, 'common dovetail' and 'lap dovetail'; and No. 8, 'housing, grooved and tongued.' It may be added that the various joints are illustrated in plan, elevation, and section: that the drawings are in isometric projection, to allow of measurements being made in all parts; and that to each diagram is appended a list of the tools necessary for the particular construction illustrated. The series has our warm commendation, and will, we trust, command the success it merits.

First Mathematical Course. London: Blackie and Sons.

This manual of 170 pages consists of three parts. The Arithmetic is confined mainly to a revision of the subject as far as fractions, and then such additions as seemed necessary for the first stage of the Mathematical Examination, South Kensington.

The Algebraical portion consists of about 60 pages of rather closely-printed matter and exercises. There is nothing striking in the setting out of the definitions and propositions. The pages are too crowded to be attractive to the pupil. It is always well to have more in the book than all are expected to learn—a sort of reserve for the cleverest. More space should have been given to the first four rules, and also more to the important subject of factors.

The part devoted to Geometry is specially disappointing. Here, if anywhere, the book should have been striking to the eye, and as attractive and easy to follow as it could be made. Instead of that, the propositions are written out in continuous lines, as in the article of a newspaper; few symbols are used, and the effect is one of prolixity and confusion.

Instead of putting a few simple exercises, the simpler the better, at the end of each proposition, a collection of them is placed at the end in batches upon propositions 1—13, 14—27, and so on. The late Professor Townshend told the writer that after learning the first proposition of the first book of Euclid, his teacher told him to join the ends of the base with the other point of section of the circles, and then prove that another triangle could be described: a simple performance surely, but one, he said, that gave immediate and permanent interest to the subject. We cannot commend the use of this book. It is not so much bad in itself as it is ill-adapted to the purpose in hand. Introductory books should be simple, clear, easy to follow, containing nothing to unlearn, and withal bright and attractive. The volume before us does not, in our opinion, satisfy these tests.

Accent and Rhythm explained by the Law of Monopressures: Part I. Edinburgh and London: William Blackwood and Sons.

The anonymous author of this volume seeks to establish a somewhat novel theory as the basis of a variation from the explanation of accent and rhythm to be found in the ordinary text-books of prosody. He points out that the stream of air proceeding from the lungs in the action of reading or speaking, being acted upon by the vocal organs is interrupted and cut into portions. During the course of each of these sub-divisions only one accent or principal stress of voice is possible. This gives the name monopressure. With each accented syllable, however, an unaccented one may be combined, either before or after, or an unaccented syllable may both precede and follow the accented one. This gives four possible forms for the sounds or groups of sounds constituting a monopressure. These may be illustrated by the four words, plant', implant', plant'ing, implant'ed. A special notation is devised to indicate these forms, and may be used to represent a kind of scansion of verse or prose. The application of the theory admits of much variation, but the opinion of the writer seems to be a sound one, that reading and speaking will be easy according to the frequency with which the trisyllabic monopressure can be introduced, and they will be pleasant to the ear according to the variety of monopressure forms employed.

Passages from Scripture, Gray's 'Elegy,' and some of his Odes, and extracts from Shakespere, Milton, Addison, Scott, and other writers, are used as examples to illustrate the theory, which certainly throws some new light on questions of prosody and elocution.

A School Arithmetic. By G. H. Bateson Wright, M.A. London: Swan, Sonnenschein and Co.

This volume, having been prepared by the author for a collegiate school in Hong Kong, has been published in this country in order to extend its sphere of usefulness. It does not differ very widely from other arithmetical class-books for school and college use. Nevertheless, there are some features that deserve favourable mention. The explanations are clear and exhaustive; the graphic method is employed to illustrate square and cubic measures; several neat methods of abbreviating lengthy operations are exemplified; processes based on algebraical principles are adapted to the treatment of exercises on surds, involution, and problems on areas and volumes; and the very numerous examples are for the most part actical and original. The book is printed in a good clear type and strongly bound.

Names and Synonyms of British Plants. By G. Egerton-Warburton, M.A. London: G. Bell and Co.

This hand-book is an attempt to make the difficulties of botanical nomenclature somewhat less, whilst pointing out what perplexing confusion does exist, not only in the names given to various plants, but also in the rank which they should take as species, sub-species, or varieties. The author tells us that the list is compiled from the five best authorities on British Plants, and contains the name of every plant considered as a species by any of them, the place of honour being to that name for a plant which is used by a majority of the five.

The book contains 160 pages. The type, printing, and paper and binding are all uniform and excellent. An important help has been afforded in the marking of the place of the accent in the case of the botanical names. Words like clematis and colyledon umbilicus are nearly always mispronounced by learners who have not learned an ancient language. As a book of reference, at once useful, handy and inexpensive, the volume before us will no doubt be appreciated.

Clarendon Press Series: Campbell's Gertrude of Wyoming. A Pennsylvanian Tale. Edited, with Introduction and Notes, by H. Macaulay Fitzgibbon, M.A. Oxford: at the Clarendon Press.

Campbell's pleasing but rather neglected poem is here presented with a most copious assortment of notes, such as we usually find in Clarendon Press Editions. The annotations are not only copious and varied, but they contain information of a most interesting sort. Many works of travel and natural history have been largely drawn upon for explanations of the natural objects mentioned in the poem, and for illustrations of the manners and customs of the Indian tribes, and geographical features of the scene described. Many of these were given by the poet himself in the early editions of Gertrude. They have, however, been extended to such length, that the work seems to be somewhat overloaded. The poem containing less than one hundred stanzas occupies less than thirty pages, but the introduction, notes and appendices extend to 150 pages of small type, which really seems excessive. Campbell's rhymes and constructions are not always perfect, and the editor does well in pointing out defects, but in some cases the comments savour of hypercriticism, as when *shook* is called a bad rhyme for *brook* and *hook*, and *clime crime*, *gloom tomb*, are criticised.

Any student who goes carefully through this book will be likely not only to understand the poem thoroughly but to acquire a wealth of knowledge on collateral subjects.

Hossfeld's New Method for Learning the Spanish Language. By T. S. Gurrin. London: Society for Promoting the Knowledge of Foreign Languages.

If there is one thing that cannot help striking anyone who has any acquaintance with grammars of foreign tongues at all, it is that there is much that is old and scarcely anything that is new in this method. We have here the familiar exercises of the 'Has she a dog? No, but she has a pen' type, based on one or two grammar rules, and a vocabulary, followed by a conversation after the manner of Otto, and a reading exercise with an interlineal translation. After thirty courses of this kind, we come upon *twenty dialogues of everyday life*, and this closes the first part, or the accidence. In the second part the syntax is treated on a similar plan, only here the reading-lessons are minus the interlineal translation. At the end of the book there is a collection of Spanish proverbs and a slight introduction to commercial Spanish. But, although the book contains nothing new as regards its method, it gives a fairly exhaustive account of the grammar with plenty of material to practise upon, and as such it may be highly commended. Those who are content to acquire Spanish in the old way will not be disappointed in buying it, but he who desires to acquire Spanish by the light of the Latin, Italian or French he may already possess, will be disappointed.

Higher Grade English. London and Edinburgh: T. Nelson and Sons.

The title of this volume is not a happy one, but the contents are of a high order. The volume is devoted to the consideration of the English language viewed historically and practically, and is meant to include the whole of the work in English required for the Senior Locals of the Universities and other similar examinations.

The writer acknowledges his indebtedness to the results of the researches of our greatest English scholars in the compilation of the work. The way in which he has done his part, however, is very satisfactory. The arrangement is clear, the definitions are precise, and the examples for illustration full and accurate. The book has all the good features of binding, printing and illustration characteristic of this publishing firm.

Useful Birds of Europe (a Wall Sheet illustrating). London: G. W. Bacon and Co.

The technical work shown in the lithography of this sheet is excellent; and the drawing and colouring of the forty-seven birds illustrated thereon are so faithful to nature as to render the task of recognition a very easy one. The only slip we have noted is in connection with the bird designated as No. 26, which is a cock chaffinch, and not a bullfinch, as stated in the references at the foot of the sheet. The slate-grey back, ruddy breast and jet-black head of the latter bird are sufficiently distinctive to remove all chance of mistake. Exception might be taken by some persons to the classification amongst 'useful' birds of certain of the birds represented here, but on the other hand the sheet is by no means exhaustive of those which are undoubtedly to be considered as serviceable to man. The sheet illustrates so many of our country favourites that it ought to be welcomed in every school in the land.

A First German Reader and Writer. By E. A. Sonnenschein, M.A. London: Swan Sonnenschein and Co.

It would be difficult to give too high praise to this elementary reader and writer. It fulfils in almost every respect the conditions of a perfect class-book for junior pupils in German. The reading lessons begin with very short sentences, and gradually lead up to short extracts in very easy German. Then follow a set of exercises for translation into German, based upon the preceding reading lessons, with some elementary grammar worked in between. At the end there are vocabularies to each lesson, and an English as well as a German alphabetical vocabulary. The sentences of the English exercises are in good English, in pleasant contrast to those of so many elementary exercise-books. Yet it seems very difficult to avoid every appearance of unreality in such primers, for even here the following are given as model-sentences: *I have become a soldier* and *Blücher had become a prince.*

The Forty Robbers; or, 'Open Sesame:' a School Operetta. By H. B. Black, B A., and R. T. Gibbons, F.C.O. London: Curwen and Sons.

The introduction states that 'this Operetta was composed specially for the choir of the Grocers' Company's School, Hackney Downs. It is intended, however, as a musical drama which could easily be sung and acted by a capable choir of boys and girls, such as is found in many of our larger schools. It is scored for two violins, violoncello, double bass, flute, cornet, euphonium, and pianoforte, and the orchestral parts can be hired from the publishers.'

We can commend the Operetta as in every respect one of the best which has yet appeared for school use.

The Civil Service Manual, 1889. London: Simpkin Marshall and Co.

This book will be of service to parents seeking entrance to the Civil Service for their sons. Teachers will find in it all the essentials required to be known in the preparation of candidates. It brings together detailed information respecting the Entrance Examinations for the Military, Naval, Home, Indian and Colonial Services and the Banks of England and Ireland, including those services for which a nomination is needed. Directions for study, examination papers, particulars respecting successful candidates, scales of marks and other interesting details, make up a very useful guide which is published at a reasonable price.

Notes on Shakespeare's Play of Hamlet. By T. Duff Barnett, B.A. (Lond.) London: George Bell and Sons.

Of this addition to the admirable series of notes on Shakespeare's plays which Mr. Barnett has previously produced and which we have from time to time noticed, it is necessary to say but little. The same fulness of information, the same careful, convenient, and complete classification of the aid given under various headings, in short, the same thoroughness marks this volume as was conspicuous in its predecessors. We cannot, however, forbear to bestow a word of hearty praise on the excellent and eloquent Introduction. The comparison of the characters of Hamlet and Brutus, of Hamlet and Richard II., of Ophelia and Brutus' Portia; the lucid distinction drawn between historical plays and tragedies; the discussion of the question—was Hamlet mad? and the analysis of his moral weakness and his strength afford examples of strong common-sense and keen critical insight, and should materially help the student to a real understanding of the spirit of this—probably the greatest of all Shakespeare's plays.

Musical Anecdotes. London: George Gill and Sons.

This is a collection of stories of the Great Musicians, interesting for occasional reference, but of no great educational value.

The portraits, with which the work is liberally embellished, form in our opinion its chief attraction, most of them being excellent.

Les Francs Chasseurs. By T. M. Pattison. London: Curwen and Sons.

Mr. Pattison's School Cantatas are so well known that the French Version now before us will commend itself to the attention of all Teachers who desire their elder scholars to have a familiar acquaintance with the pronunciation of French Poetry.

The music is exceedingly bright and tuneful, while the French words are an imitation of the English from the pen of Mr. A. J. Foxwell.

Nursery Toy March. By W. R. Glanvill and W. T. Deane. London: Curwen and Sons.

Teachers in search of something novel and attractive, would do well to look at this March.

It is written for two trebles and a bass, with piano accompaniment; and there are also parts for triangle, rattle, bells, castanets, trumpets, drum and piccolo.

The music is bright, tuneful and easy.

The Royal English Classics:
Milton. Paradise Lost. Book I.
Addison. Sir Roger de Coverley.
Scott. Marmion. Canto VI.
London: T. Nelson and Sons.

In the samples before us the aim of the series appears to be fully attained. That aim, we are told, is to produce in portions suitable for use in schools, and in handy form, the works of Standard authors with such short pithy notes as may be really helpful and necessary. Each book begins with a brief biographical sketch of the author; and this is followed by an outline or account of the work from which the text is taken. The text is clearly printed, and at the end of the book is found a sufficient body of notes of exactly the sort needed by young students. We can heartily commend each of these books.

The Century Readers: Home Lesson Book, No. VI. London: Blackie and Sons.

This completes a very useful series of books for preparation of home lessons. It contains the spelling lists, explanations of meanings, passages of poetry for repetition, grammar lessons and exercises, and other memory work included in the Century Reader for the sixth Standard. Where this reader is used the adoption of the corresponding home lesson book will save much wear and tear.

Picture Alphabet Chart. London: G. W. Bacon and Co.

This chart should prove a delight to many an infant class; and we can well imagine the interest of the little learners quickened and their receptive capacities energized by the pictures illustrating the various letters. The capitals are boldly coloured in red, the small letters in blue, and to each letter of each kind is added an illustration printed in colours of some easily-recognisable object.

Bacon's Excelsior Combination Atlas. London: G. W. Bacon, 127, Strand.

This atlas derives its name from combining the maps necessary for pupil teachers of the first year and the fourth Standard of the code. There are six full coloured maps—the British Isles, England, Scotland, Ireland, Canada and Australia, and ten memory maps, with outline and rivers in blue, and mountains and towns in black. The second book of the series is for pupil teachers of the second year and Standard five. It contains three general maps, and thirteen memory maps. These are just what are needed for examination purposes and each book is a cheap sixpennyworth.

The Holborn Practical Reader. I.-IV. London: Educational Supply Association, Limited.

These are practical readers; not too difficult, carefully graduated and pleasantly illustrated. Teachers and scholars will all like them.

The Townley Standard Geographies. Stand. III. By an Inspector of Schools. London: A. G. Dawson, Ivy Lane.

A little book containing the memory work of the geography prescribed for Standard III. It is well arranged, clearly printed, and has three uncoloured maps of England and Wales—physical, political, and railway.

Mental Arithmetic. Standards III. and IV. By T. J. Macnamara. London: A. G. Dawson, Ivy Lane.

Little books containing a reprint of articles which have already appeared in magazine form. They consist of notes and typical questions in the various rules to which the children in these Standards have to devote themselves, as well as preparation for the next higher Standard. The questions are well graduated and calculated to develop intelligence. On page 29 of Standard IV. an awkward misprint occurs, '30 sq. poles = 1 rood.'

Ablett's Drawing Copies. No 14. Stand. VI. London: Blackie and Son.

This is a good number in the series. It contains twenty-two full figures of straight lined and curved models, besides many detailed drawings and letterpress instruction and notes. Patient working of the twelve lessons will produce good results and give a good knowledge of the method of drawing regular forms.

ADOPTED BY THE LONDON SCHOOL BOARD

Messrs. CASSELL & COMPANY have much pleasure in stating that the following Works have been adopted by the London School Board for the use of Teachers and Scholars belonging to the Schools of the Board.

NOTE.—Samples may be seen at the School Board Offices, Victoria Embankment.

	Requisition List. Page	Number.
READING.		
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